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A Vegetative Key to Some Common Arizona Range Grasses

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Abstract

Seventy-seven common Arizona range grasses are included in this vegetative key. A shortcut key also assists in rapid identification. In a separate section, grasses are grouped according to major vegetative characters. A sketch of the ligule and collar area of each species provides an easy means of comparison with certain key characters. A detailed description of the vegetative characters of each species provides a final check on identification.

A Vegetative Key to Some Common Arizona Range Grasses¹

by

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INTRODUCTION

Native and cultivated grasses must often be identified when plants are immature or have been heavily grazed and, thus, do not have flower stalks. Under such conditions, conventional botanical manuals offer little assistance. Examination of vegetative characteristics, however, will often permit tentative identification until better developed specimens are available.

The purpose of this paper is to present an illustrated key for the identification of 77 common Arizona range and pasture grasses by vegetative characters.

A technical knowledge of taxonomic botany, although useful, is not essential to use this method of identification. A common magnifying glass or hand lens of 5 to 10 power, plus a small millimeter scale, will prove helpful.

This publication is planned to be used in conjunction with Arizona Range Grasses (Ariz. Agric. Exp. Stn. Bull. 298), or with Hitchcock's Manual of the Grasses of the United States (U.S. Dep. Agric. Misc. Pub. 200). Photographs or drawings of the plants covered here may be found in these two publications.

DESCRIPTIONS OF VEGETATIVE CHARACTERS

Annual or perennial.—Annual grasses generally have fine, poorly developed root systems, and no evidence of old, previous year's culm bases. Perennial grass root systems are better developed, and evidence of last year's leaves or flower stalks can usually be found. Presence of creeping root stalks, rhizomes, stolons, etc., always indicates a perennial grass. Seedling perennial grasses may occasionally be confused with annuals. Some caution should be used with this character in short-lived perennials such as *Bouteloua rothrockii* (fig. 1).

Vernation.—This refers to the cross section of a grass blade in a developing shoot. Vernation may be best determined by cutting across the sheath just below the collar, and observing the shape of the enclosed cut blade with a strong hand lens. Care should be used to make the cross section with a razor blade or sharp knife, to avoid mashing the enclosed blade and destroying its original shape. Vernation may be folded, rolled (or curled), or clasped (fig. 2).

Folded vernation is generally associated with a flattened sheath, and rolled or clasped with a rounded sheath, but this does not always hold true.

Blades.—Width and length of blades vary somewhat, depending on growing conditions, but within limits offer an easy method to separate certain species. Shaded plants have longer and wider blades than those exposed to the sun.

Nerves may be raised on either surface—sometimes prominently, as on the upper surface of *Koeleria cristata* blades.

Blades may be folded, flattened, or rounded. Normally flat blades may tend to appear round as they dry, but examination of the base of the blade above the sheath will reveal its normal condition. Blade tips may be boat-shaped, as in some species of *Poa*.

Grass blades are two-ranked, while sedges are three-ranked (fig. 1).

Auricle.—Small, membranous extensions of the collar of some grasses, notably of *Agropyron*, *Lolium*, and others of the tribe *Hordeae* (fig. 2).

Ligule.—This is an organ clasping the stem at the junction of the blade and sheath. It may be membranous or hairy, or both, as in truncate-ciliate ligules. Size, shape, and type of ligule is quite constant, and provides one of the best vegetative characters for identification (fig. 3).

Collar.—This is the junction of leaf blade and sheath. It may be a broad or narrow band, glabrous or covered with fine hair. The margin may be glabrous, hairy, or with glandular hairs.

Sheath.—The tubular basal portion of the leaf, below the blade that clasps the stem. The sheath may be closed, as in *Bromus*, or open. Ruptured closed sheaths should not be confused with normally open ones (fig. 2).

The sheath of certain grasses may have a thin, membranaceous, hyaline margin.

Internodes.—The area between successive nodes.

Nodes.—The joints of a grass stem or culm.

Roots.—Grass root systems are fibrous, but rhizomes or thickened underground stems may also be present.

Culm.—The flowering stem of a grass, generally round or elliptical in cross section (fig. 1) as opposed to the triangular stems of sedges. Rushes have pithy stems, while most grasses have hollow stems.

Considerable variation may be expected in certain characters such as degree of hairiness of the blade or sheath, length and width of blade, etc. It may therefore be necessary to examine several specimens before deciding what is a representative condition. Other characteristics, such as type of ligule and vernation, are generally rather constant.

HOW TO USE THE KEY

To use the key, first examine the plant to see if it is annual or perennial. If perennial, go to Section B. Identification is then made by a series of opposing choices, until a name is reached in the key.

In the short-cut method, refer first to the condensed key which lists major characters with their number location in the key. For example, should the plant have stolons, go immediately to Item 10 in the key, and continue from there. Should this fail to bring you to an acceptable decision, start over at the beginning of the key. Remember, only 77 of the more common range grasses are covered by this key.

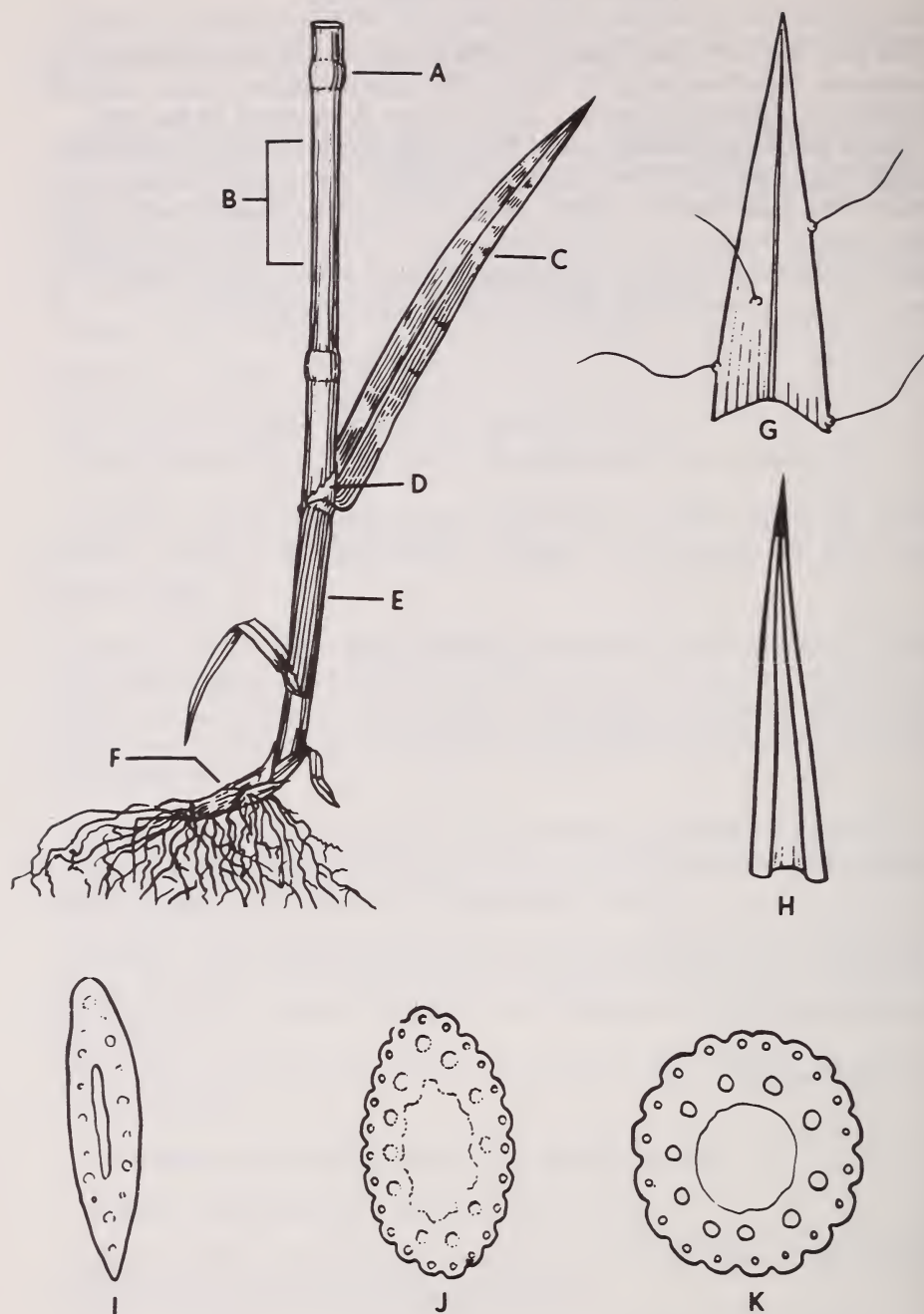


Figure 1.—Grass identification characters.
 Parts of typical grass plant: A, node; B, internode; C, blade; D, ligule; E, sheath; F, rhizome. Leaf blades: G, with glandular hairs; H, with pungent tip. Culm shape in cross section: I, flat; J, elliptical; K, round.

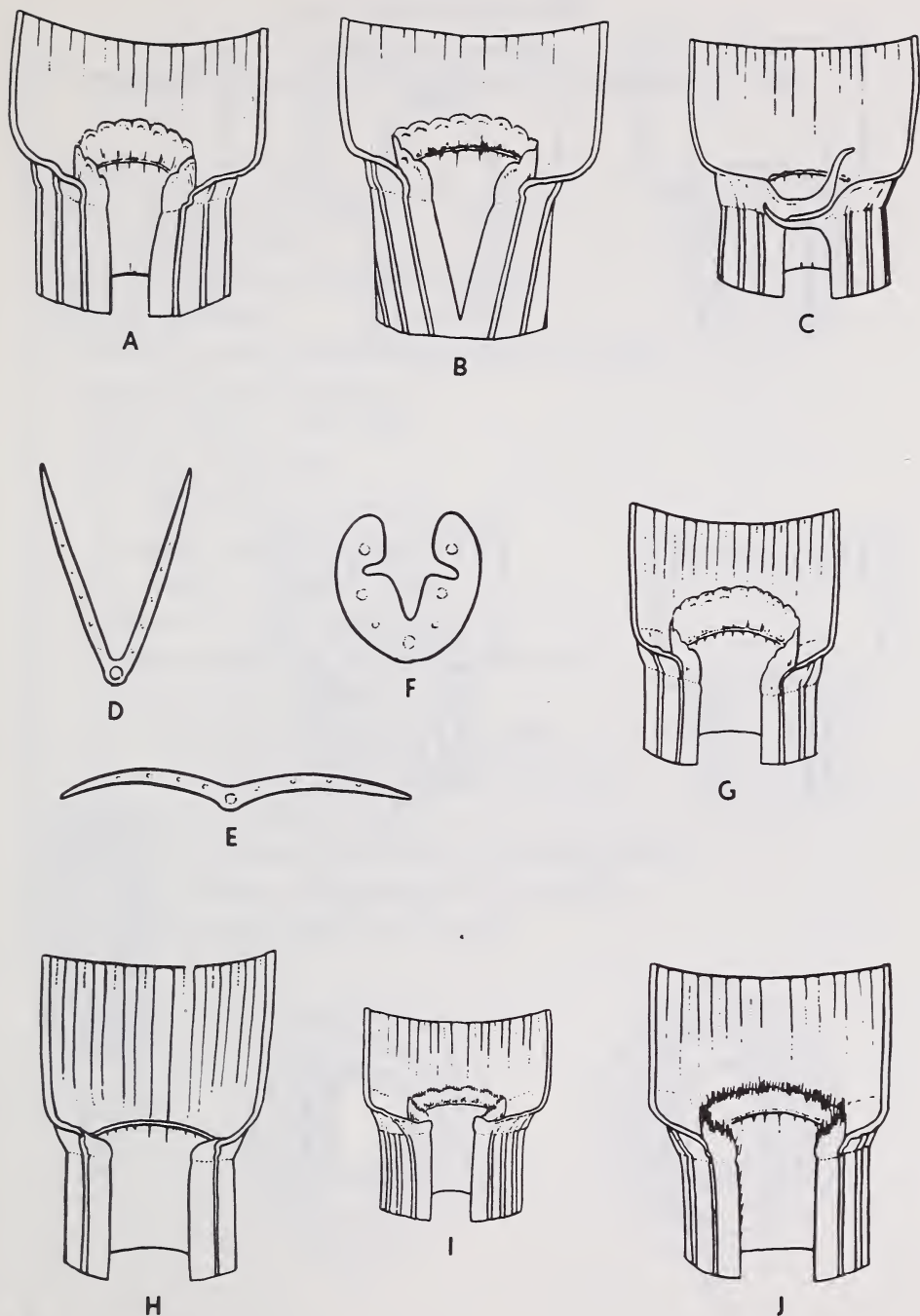


Figure 2.—Grass identification characters.
Sheaths: A, open; B, closed; C, with clasping auricle. **Leaf shape in cross section:** D, folded; E, flat; F, round. **Ligule types:** G, membranous; H, collar-like; I, hairy; J, truncate-ciliate (membranous with ciliate margin).

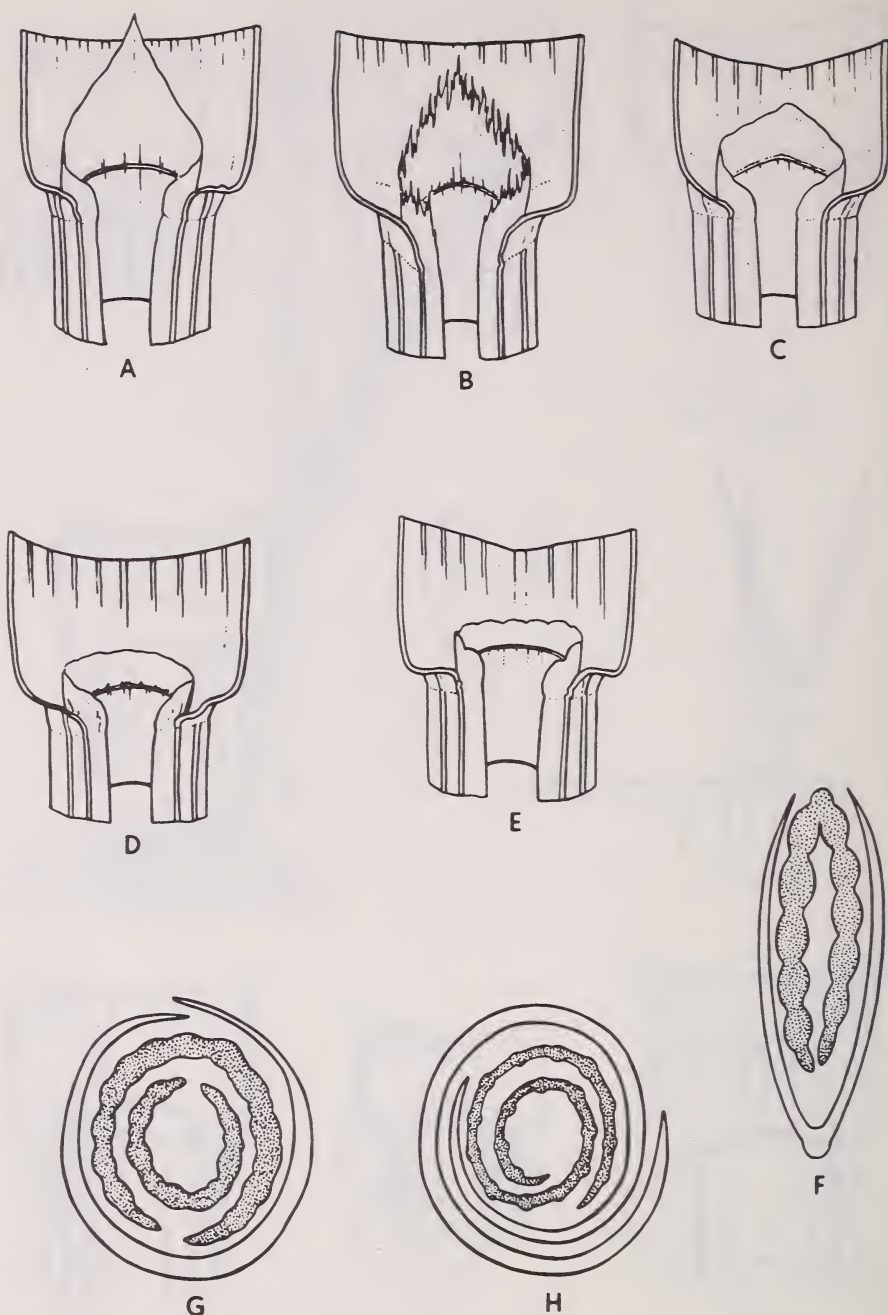


Figure 3.—Grass identification characters.
 Membranous ligule shapes: A, acute; B, acute-lacerate; C, obtuse; D, truncate; E, truncate-notched. Vernation (cross section of leaf in bud): F, folded; G, clasped; H, curled or rolled.

CONDENSED KEY

Major Character Headings by Number in Key

Section A - Annual

Section B - Perennial

1 - Auricle present

3 - Blade glossy on lower surface

5 - Bulb present

6 - Flowers and blades clustered at apex

7 - Blade tip very sharp

8 - Ligule large, 5-18 mm.

10 - Stolons present

14, 77 - Rhizomes present

23 - Sheath margin white

23, 25 - Blade margin white

28 - Letter M or W on blade

29 - Rachis extends beyond florets

30 - Culms root at nodes

33, 80 - Internode hairy or woolly

37 - Blade margin with glandular hairs

42 - Growth a mat or sod

44 - Sheath closed partially or completely

46 - Node hairy, pubescent, or woolly

74 - Panicle included in sheath

GRASSES GROUPED ACCORDING TO OUTSTANDING CHARACTERS

1. Auricles
 - 1 - *Agropyron desertorum*
 - 2 - *Agropyron smithii*
 - 66 - *Sitanion hystrix*
 - 44 - *Lolium perenne*
2. Stolons
 - 31 - *Cynodon dactylon*
 - 32 - *Distichlis stricta*
 - 38 - *Hilaria belangeri*
 - 57 - *Panicum obtusum*
3. Nodes Hairy or Pubescent
 - 4 - *Andropogon barbinodis*
 - 38 - *Hilaria belangeri*
 - 41 - *Hilaria rigida*
 - 50 - *Muhlenbergia pungens*
 - 64 - *Setaria geniculata*
 - 75 - *Trichachne californica*
 - 76 - *Tridens muticus*
4. Blade Tip Very Sharp
 - 50 - *Muhlenbergia pungens*
5. Flowers Clustered at Apex
 - 77 - *Tridens pulchellus*
6. Corm or Bulb
 - 55 - *Panicum bulbosum*
7. Sheath Margin White
 - 45 - *Lycurus phleoides*
 - 51 - *Muhlenbergia richardsonis*
 - 62 - *Schedonnardus paniculatus*
8. Stems or Culm Root at Nodes
 - 19 - *Bouteloua eriopoda*
 - 38 - *Hilaria belangeri*
 - 77 - *Tridens pulchellus*
9. Rachis Extends Beyond Spikelets
 - 22 - *Bouteloua hirsuta*
10. Sheath Closed Partially or Completely
 - 24 - *Bromus anomalus*
 - 25 - *Bromus arizonicus*
 - 26 - *Bromus ciliatus*
 - 27 - *Bromus inermis*
 - 28 - *Bromus rubens*
 - 29 - *Bromus tectorum*
11. Flowers Inserted in Sheath
 - 69 - *Sporobolus asper*
 - 70 - *Sporobolus cryptandrus*

12. Internode Hairy
19 - *Bouteloua eriopoda*
33 - *Elyonurus barbiculmis*
41 - *Hilaria rigida*
64 - *Setaria geniculata*
13. Blade Margin with Glandular Hairs
15 - *Bouteloua aristidoides*
17 - *Bouteloua chondrosioides*
18 - *Bouteloua curtipendula*
19 - *Bouteloua eriopoda*
20 - *Bouteloua filiformis*
22 - *Bouteloua hirsuta*
23 - *Bouteloua rothrockii*
37 - *Heteropogon contortus*
38 - *Hilaria belangeri*
56 - *Panicum bulbosum*
14. Growth a Mat or Sod-Like
2 - *Agropyron smithii*
21 - *Bouteloua gracilis*
31 - *Cynodon dactylon*
38 - *Hilaria belangeri*
51 - *Muhlenbergia richardsonis*
53 - *Muhlenbergia torreyi*
56 - *Panicum bulbosum*
15. Blade Margin White
4 - *Andropogon barbinodis*
45 - *Lycurus phleoides*
67 - *Sorghum halepense*
75 - *Trichachne californica*
16. Blade Folded
5 - *Andropogon cirratus*
6 - *Andropogon scoparius*
44 - *Lolium perenne*
45 - *Lycurus phleoides*
47 - *Muhlenbergia emersleyi*
53 - *Muhlenbergia torreyi*
55 - *Panicum bulbosum*
59 - *Poa fendleriana*
60 - *Poa longiligula*
61 - *Poa pratensis*
62 - *Schedonnardus paniculatus*
64 - *Setaria geniculata*

17. Rhizomes
- 2 - *Agropyron smithii*
 - 3 - *Agrostis alba*
 - 27 - *Bromus inermis*
 - 31 - *Cynodon dactylon*
 - 32 - *Distichlis stricta*
 - 39 - *Hilaria jamesii*
 - 40 - *Hilaria mutica*
 - 51 - *Muhlenbergia richardsonis*
 - 61 - *Poa pratensis*
 - 67 - *Sorghum halepense*
18. Blade Glossy Ventrally
- 44 - *Lolium perenne*
19. Sheath Base Color Usually Pink
- 44 - *Lolium perenne*
20. Blade A Bristle, Needle-Like, Round
- 8 - *Aristida divaricata*
 - 9 - *Aristida glabrata*
 - 10 - *Aristida glauca*
 - 11 - *Aristida longiseta*
 - 12 - *Aristida purpurea*
 - 13 - *Aristida ternipes*
 - 14 - *Blepharoneuron tricholepis*
 - 33 - *Elyonurus barbiculmis*
 - 36 - *Festuca arizonica*
 - 46 - *Muhlenbergia curtifolia*
 - 48 - *Muhlenbergia montana*
 - 50 - *Muhlenbergia pungens*
 - 51 - *Muhlenbergia richardsonis*
 - 52 - *Muhlenbergia rigens*
 - 54 - *Oryzopsis hymenoides*
 - 63 - *Schismus barbatus*
 - 68 - *Sporobolus airoides*
 - 73 - *Stipa neomexicana*
 - 76 - *Tridens muticus*
 - 77 - *Tridens pulchellus*
21. Letter M or W on Blade
- 27 - *Bromus inermis*
22. Usually Glandular Hairs on Sheath
- 55 - *Panicum bulbosum*
 - 56 - *Panicum obtusum*

23. Seeds Three-Awned

A - One long and two short

13 - *Aristida ternipes*

B - Three of equal length

7 - *Aristida adscensionis*

8 - *Aristida divaricata*

9 - *Aristida glabrata*

10 - *Aristida glauca*

11 - *Aristida longiseta*

12 - *Aristida purpurea*

24. Single Awn

A - Short - one inch or less

4 - *Andropogon barbinodis*

29 - *Bromus tectorum*

30 - *Chloris virgata*

47 - *Muhlenbergia emersleyi*

48 - *Muhlenbergia montana*

49 - *Muhlenbergia porteri*

50 - *Muhlenbergia pungens*

67 - *Sorghum halepense*

B - Long awn - more than one inch

a - Straight

66 - *Sitanion hystrix*

b - Twisted or geniculate

73 - *Stipa neomexicana*

74 - *Stipa pringlei*

37 - *Heteropogon contortus*

25. Stems Flat

4 - *Andropogon barbinodis*

6 - *Andropogon scoparius*

34 - *Eragrostis intermedia*

37 - *Heteropogon contortus*

43 - *Leptochloa dubia*

45 - *Lycurus phleoides*

53 - *Muhlenbergia torreyi*

55 - *Panicum bulbosum*

60 - *Poa longiligula*

61 - *Poa pratensis*

62 - *Schedonnardus paniculatus*

65 - *Setaria macrostachya*

26. Culms Usually Branched
- 3 - *Agrostis alba*
 - 4 - *Andropogon barbinodis*
 - 7 - *Aristida adscensionis*
 - 9 - *Aristida glabrata*
 - 10 - *Aristida glauca*
 - 13 - *Aristida ternipes*
 - 15 - *Bouteloua aristidoides*
 - 18 - *Bouteloua curtipendula*
 - 30 - *Chloris virgata*
 - 31 - *Cynodon dactylon*
 - 33 - *Elyonurus barbiculmis*
 - 35 - *Eragrostis lehmanniana*
 - 38 - *Hilaria belangeri*
 - 41 - *Hilaria rigida*
 - 45 - *Lycurus phleoides*
 - 49 - *Muhlenbergia porteri*
 - 57 - *Pappophorum mucronulatum*
 - 64 - *Setaria geniculata*
 - 67 - *Sorghum halepense*
 - 69 - *Sporobolus asper*
 - 70 - *Sporobolus cryptandrus*
 - 75 - *Trichachne californica*
 - 77 - *Tridens pulchellus*
27. Ligule Large - Acute
- A - 2-5 mm.
 - 25 - *Bromus arizonicus*
 - 34 - *Eragrostis intermedia*
 - 45 - *Lycurus phleoides*
 - 59 - *Poa longiligula*
 - B - 5-8 mm.
 - 48 - *Muhlenbergia montana*
 - C - 8-15 mm.
 - 47 - *Muhlenbergia emersleyi*

VEGETATIVE KEY

Section A - Plants, Annual

- 1a Ligule a membrane or collar (a truncate-ciliate ligule is classified as membranous).
- 2a Sheath closed.
- 3a Blades 4-6 mm wide.25. *Bromus arizonicus*
- 3b Blades narrower, 1-4 mm wide.
- 4a Ligule acute-lacerate; internodes sometimes puberulent near nodes; mature plants reddish brown. Lower chaparral and desert shrub formations below 6,000 feet.28. *Bromus rubens*
- 4b Ligule obtuse-lacerate; internodes glabrous. Generally above 6,000 feet.29. *Bromus tectorum*
- 2b Sheath open.
- 5a Ligule truncate-ciliate, 1 mm; blades with dorsal glandular hairs; lower nodes geniculate; culms branched; awned. Below 5,000 feet.30. *Chloris virgata*
- 5b Ligule acute-lacerate, 2-4 mm long; blades 2-5 mm wide 4-12 cm long. Desert to woodland 1,000-5,000 feet.58. *Poa bigelovii*
- 1b Ligule hairy.
- 6a Blades needle-like, short and decumbent, ½-1 mm wide, 3-8 cm long; long hairs back of ligule and collar, 3-8 mm long. Dry slopes and sandy washes below 4,000 feet.63. *Schismus barbatus*
- 6b Blade not needle-like.
- 7a Collar and blade with glandular hairs, 2-3 mm; blade in bud folded, ½ mm wide, 1-2 cm long; ligule hairy, ½ mm; awns 1-2 cm. Below 6,000 feet.7. *Aristida adscensionis*
- 7b Collar without glandular hairs.
- 8a Blade margin with glandular hairs; culm elliptical; ligule hairy, ½ mm, blade in bud curled; stem branches; blades ½ mm wide, 2-7 cm long. Woodland below 6,000 feet.15. *Bouteloua aristidoides*
- 8b Blade margin without a glandular hairs, flat, narrow and short, 1 mm wide, 2-4 cm long; culm round, ligule hairy, 1 mm; awns, 1-2 mm. Waste places throughout the State below 6,000 feet.16. *Bouteloua barbata*

Section B - Plants, Perennial

- 1a Auricle present, sometimes rudimentary.
 - 2a Auricle prominent, clawed.
 - 3a Blades glossy below; introduced plants of lawns, tame pastures.44. *Lolium perenne*
 - 3b Blades not glossy below.
 - 4a Rhizomes present; blade ribs prominent dorsally; foliage characteristically glaucous, blue-green.2. *Agropyron smithii*
 - 4b Rhizomes absent; blades conspicuously pubescent or rarely glabrous; tufted bunchgrass.66. *Sitanion hystrix*
 - 2b Auricle rudimentary.1. *Agropyron desertorum*
- 1b Auricle absent.
 - 5a Culm-bases thickened into bulb-like corms.55. *Panicum bulbosum*
 - 5b Culm-bases not bulb-like.
 - 6a Inflorescences and blades clustered at the apex, the blades exceeding the uppermost florets; plants small, blades involute, 2-5 cm long, ¼ mm wide, the plant 5-10 cm high.77. *Tridens pulchellus*
 - 6b Inflorescences and blades not clustered at apex.
 - 7a Blade tip pungent, stiff and sharp; common on loose sand, woodland and pine areas.50. *Muhlenbergia pungens*
 - 7b Blade tips not sharp.
 - 8a Ligule large, 5-18 mm.
 - 9a Ligule acute-lacerate; culm elliptical; blades folded; large coarse bunchgrass.47. *Muhlenbergia emersleyi*
 - 9b Ligule acute-entire; culm round; blades rolled, occasionally flat; small bunchgrass.48. *Muhlenbergia montana*
 - 8b Ligule smaller, usually ½-3 mm.
 - 10a Stolons present.
 - 11a Sheaths pubescent or hirsute.
 - 12a Sheaths with glandular hairs.56. *Panicum obtusum*
 - 12b Sheaths without glandular hairs.31. *Cynodon dactylon*
 - 11b Sheaths glabrous.
 - 13a Internodes woolly.19. *Bouteloua eriopoda*
 - 13b Internodes glabrous.38. *Hilaria belangeri*

- 10b Stolons absent.
- 14a Rhizomes present.
- 15a Sheath closed, letter M or W on blade.
.....27. *Bromus inermis*
- 15b Sheath open.
- 16a Ligule of hairs.
- 17a Blades large, 10-12 mm wide, 20-40 cm long; ligule 1-2 mm; rhizomes massive, often flattened; fields, ditchbanks, roadsides.
.....67. *Sorghum halepense*
- 17b Blades smaller, 2-3 mm wide, 1-6 cm long, frequently with salt deposits on upper surface.
.....32. *Distichlis stricta*
- 16b Ligule membranous.
- 18a Blade folded, the tip boat-shaped; ligule truncate-entire.61. *Poa pratensis*
- 18b Blade not folded.
- 19a Plant woolly, the bases coarse, semiwoody; dry areas below 4,000 feet.41. *Hilaria rigida*
- 19b Plants not woolly.
- 20a Blades rolled, growth mat-like.
.....51. *Muhlenbergia richardsonis*
- 20b Blades not rolled, growth not mat-like.
- 21a Ligule truncate-ciliate, 1-2 mm; blades 2-4 mm wide, 5-10 cm long, curled in the bud; culms branch at the nodes; dry, tight-soil flats, 2,000-6,000 feet, central and southern Arizona.
.....40. *Hilaria mutica*
- 21b Ligule not truncate-ciliate.
- 22a Ligule truncate-lacerate, 1-2 mm; blade curled in the bud, involute, the base of blade usually flat, 2-5 mm wide, 4-12 cm long; dry flats on tight soils, central and northern Arizona, 4,500-7,000 feet.39. *Hilaria jamesii*
- 22b Ligule obtuse-entire, 1-2 mm; blades 2-5 mm wide, 3-8 cm long; wet, cool sites generally along streams, 5,000-9,000 feet.3. *Agrostis alba*
- 14b Rhizomes absent.
- 23a Both sheath and blade margin white.
- 24a Blade folded, ligule acute-entire, 2-5 mm; culms branched; small bunchgrass of dry woodland and pine, 4,000-7,000 feet.45. *Lycurus phleoides*
- 24b Blade needle-like, ligule truncate-toothed, growth mat-like.51. *Muhlenbergia richardsonis*

- 23b Both sheath and blade margins not white.
- 25a Blade margins white.
- 26a Ligule hairy.67. *Sorghum halepense*
- 26b Ligule not hairy but membranous.
- 27a Nodes woolly; ligule a collar, obtuse-lacerate 2-3 mm; hairs on back of ligule 3-5 mm; medium to large bunchgrass; dry, rocky slopes 1,000-6,000 feet.4. *Andropogon barbinodis*
- 27b Nodes hairy but scarcely woolly, the culms erect from a knotty swollen felty-pubescent base, 40-100 cm tall; sheaths glabrous to sparsely pilose; blades 3-5 mm wide, 8-12 cm long.75. *Trichachne californica*
- 25b Blade margins not white.
- 28a Blades with letters M or W.27. *Bromus inermis*
- 28b Blades not as above.
- 29a Rachis extends beyond florets.22. *Bouteloua hirsuta*
- 29b Rachis does not extend beyond florets.
- 30a Culms root at nodes.
- 31a Blades with glandular hairs on upper side.38. *Hilaria belangeri*
- 31b Blades without glandular hairs on upper side.
- 32a Internodes woolly.19. *Bouteloua eriopoda*
- 32b Internodes not woolly, the ligule ciliate.77. *Tridens pulchellus*
- 30b Culms not rooting at nodes.
- 33a Internodes hairy or woolly, the ligules hairy.
- 34a Ligule ½ mm19. *Bouteloua eriopoda*
- 34b Ligule larger, 1-2 mm.
- 35a Blade rolled, 1 mm wide, 15-30 cm long.33. *Elyonurus barbiculmis*
- 35b Blade not rolled, wider.
- 36a Blade flat, node woolly; ligule obtuse-lacerate 2-3 mm4. *Andropogon barbinodis*
- 36b Blade folded; ligule, node and lower internode hairy.64. *Setaria geniculata*

- 33b Internodes not hairy nor woolly.
 - 37a Blade margins, at least at the base, with glandular hairs.
 - 38a Ligule membranous, 1-2 mm, collar with glandular hairs.18. *Bouteloua curtipendula*
 - 38b Ligule not membranous.
 - 39a Culm flattened in the bud.
 -37. *Heteropogon contortus*
 - 39b Culm round in cross section.
 - 40a Ligule 2-4 mm23. *Bouteloua rothrockii*
 - 40b Ligule smaller.
 - 41a Blade in bud clasped.
 -17. *Bouteloua chondrosioides*
 - 41b Blade in bud curled. ...20. *Bouteloua filiformis*
 - 37b Blade margins without glandular hairs.
 - 42a Growth a sod or mat-like.
 - 43a Ligule hairy.21. *Bouteloua gracilis*
 - 43b Ligule membranous.53. *Muhlenbergia torreyi*
 - 42b Growth not a sod or mat-like.
 - 44a Sheaths closed.
 - 45a Ligule truncate-notched; culm round.
 -26. *Bromus ciliatus*
 - 45b Ligule truncate-toothed, culm elliptical.
 -24. *Bromus anomalus*
 - 44b Sheaths open.
 - 46a Nodes woolly or pubescent.
 - 47a Ligule obtuse-lacerate.
 -4. *Andropogon barbinodis*
 - 47b Ligule not obtuse-lacerate.
 - 48a Blades folded.64. *Setaria geniculata*
 - 48b Blades not folded.
 - 49a Blades flat.41. *Hilaria rigida*
 - 49b Blades round.
 - 50a Blade small, about 1 mm wide, 2-5 cm long; ligule truncate-ciliate; blade tip very sharp to the touch; sandy soils of woodland and pine.
 -50. *Muhlenbergia pungens*
 - 50b Blades larger, 2-4 mm wide, 8-20 cm long; sheath margin hairy; blade in bud curled; blade usually rolled; ligule small, hairy; desert grassland and oak woodland below 5,500 feet.
 -76. *Tridens muticus*

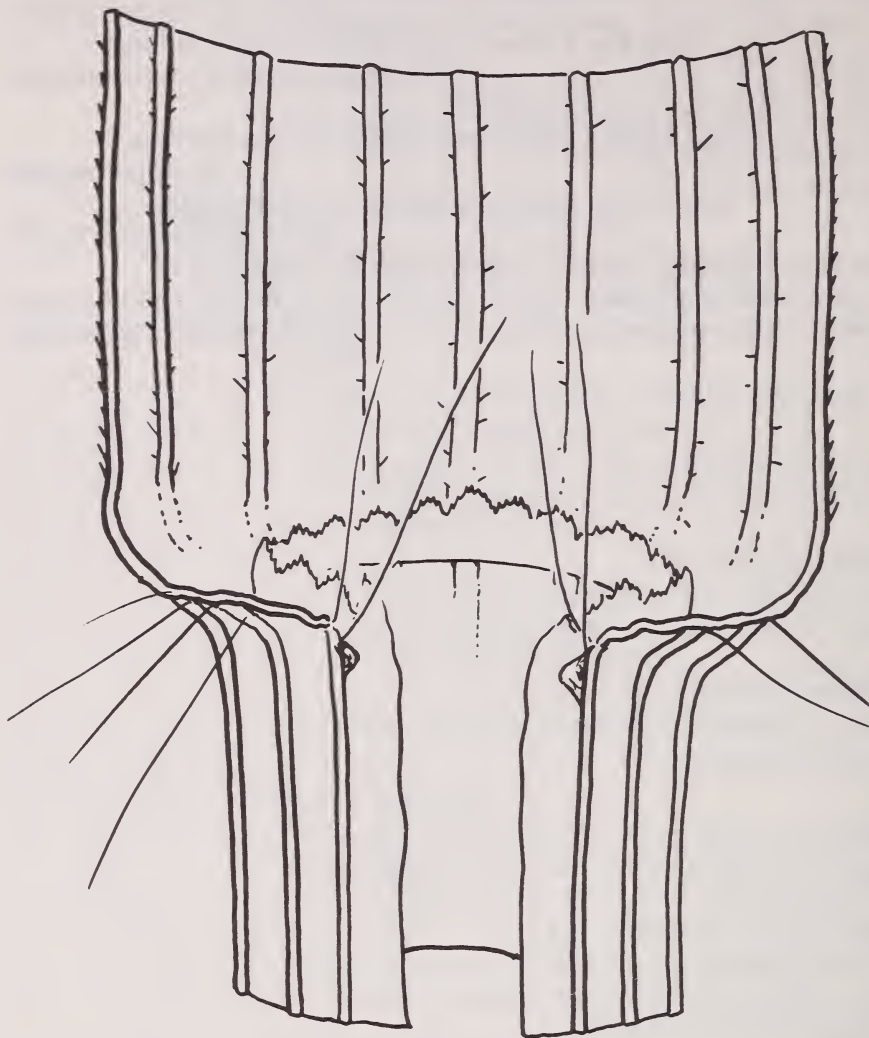
- 46b Nodes not woolly or pubescent.
- 51a Blades folded.
- 52a Growth a mat, ring-like.53. *Muhlenbergia torreyi*
- 52b Growth not mat-like or ring-like.
- 53a Ligule large, 8-15 mm47. *Muhlenbergia emersleyi*
- 53b Ligule smaller.
- 54a Culm branched45. *Lycurus phleoides*
- 54b Culm not branched.
- 55a Ligule shorter than 1 mm.
- 56a Ligule obtuse-lacerate.
.6. *Andropogon scoparius*
- 56b Ligule not obtuse-lacerate.
- 57a Ligule obtuse-toothed, about ½ mm;
blades long, narrow, folded; woodlands
and pine forests, 5,000-11,500 feet, rarely
down to 3,500 feet. . . .59. *Poa fendleriana*
- 57b Ligule truncate-entire, ¼-½ mm; bunch
or sodgrass; common in moist meadows
at medium and high elevations through-
out the State.61. *Poa pratensis*
- 55b Ligule longer than 1 mm.
- 58a Ligule obtuse-entire, 1-2 mm; old growth
usually flat, new growth blades folded, long,
narrow, plant commonly has a reddish cast;
woodland and pine forest fringe, 2,000-7,500
feet.5. *Andropogon cirratus*
- 58b Ligule not obtuse-entire.
- 59a Ligule acute-lacerate, 2-4 mm; blade 1 mm
wide, 10-20 cm long, common in chaparral,
3,500-7,500 feet.60. *Poa longiligula*
- 59b Ligule acute-entire, 2-3 mm; blade margin
white; woodland and pine, often on dis-
turbed sites.
.62. *Schedonnardus paniculatus*
- 51b Blade not folded.
- 60a Blades round or needle-like in fully developed leaves.
- 61a Ligule a collar or membranous.
- 62a Ligule large, 5-8 mm, acute-entire; blade in bud
folded, a small bunchgrass, common in woodland
and pine forests; 4,500-9,500 feet.
.48. *Muhlenbergia montana*
- 62b Ligule smaller.
- 63a Ligule less than 1 mm long.
- 64a Ligule truncate-ciliate.
- 65a Ligule with hairs on back, 1-2 mm; blade in
bud curled; short rhizomes often
present; large coarse bunchgrass of alkali
flats; 2,500-6,500 feet.
.68. *Sporobolus airoides*

- 65b Ligule with no hairs on back, truncate-ciliate, $\frac{1}{4}$ - $\frac{1}{2}$ mm; blade clasped in the bud; culms occasionally branched at nodes; small bunchgrass of dry upland sites; 3,500-6,000 feet.
10. *Aristida glauca*
- 64b Ligule not truncate-ciliate.
- 66a Ligule obtuse-ciliate, $\frac{1}{4}$ mm; blade $\frac{1}{2}$ mm wide, 25-35 cm long, needle-like, awns long, twisted, with long hairs extending to the tip.73. *Stipa neomexicana*
- 66b Ligule not obtuse-ciliate.
- 67a Ligule truncate-entire, $\frac{1}{4}$ mm; blade 1 mm wide, 5-10 cm long; small bunchgrass of pine forests, 6,000-10,000 feet, occasionally lower.
14. *Blepharoneuron tricholepis*
- 67b Ligule acute-entire, very small, $\frac{1}{4}$ - $\frac{1}{2}$ mm; blade $\frac{1}{2}$ -1 mm wide, 10-30 cm long; large bunchgrass of forest, parks and dry meadows, 7,000-10,000 feet.
36. *Festuca arizonica*
- 63b Ligule longer than 1 mm.
- 68a Ligule lacerate.
- 69a Blade veins each side of midvein 2; blade in bud clasped; sheath margin white; large coarse bunchgrass, commonly on moist, rocky sites along intermittent streams; 3,000-7,000 feet.
52. *Muhlenbergia rigens*
- 69b Blade veins each side of midvein 3-4; juniper and pine, 6,500-8,000 feet.
46. *Muhlenbergia curtifolia*
- 68b Ligule entire, 2-3 mm; collar margin pubescent; blade $\frac{1}{2}$ mm wide, 5-20 cm long; common in juniper-pinyon, 3,500-6,500 feet.
54. *Oryzopsis hymenoides*
- 61b Ligule of hairs.
- 70a Blade in bud clasped.
- 71a Ligule and collar bearded; dry sites; woodland to pine, 4,000-7,000 feet.8. *Aristida divaricata*
- 71b Ligule not bearded.
- 72a Awns 2-4 cm long; culms branch freely; blade hairs on upper surface 2-3 mm
9. *Aristida glabrata*
- 72b Awns 5-8 cm long; culms unbranched; blades glabrous on upper surface.
11. *Aristida longiseta*

- 70b Blade in bud folded.
- 73a Collar bearded; blades $\frac{1}{2}$ mm wide, 2-8 cm long; awns 2-4 mm, with purplish cast; blades rolled, needle-like, desert to pine, 1,000-7,000 feet.
.....12. *Aristida purpurea*
- 73b Collar not bearded, awns 1 long, 2 short; culm unbranched; collar with hairy margin only; culms elliptical; dry uplands; 2,500-5,500 feet.
.....13. *Aristida ternipes*
- 60b Blades flat, not round or needle-like.
- 74a Panicle exerted, not included in the sheath.
- 75a Ligule of hairs for half or more its length.
- 76a Blades sparsely pilose to pubescent, at least below.
- 77a Plants with rhizomes, forming an open to dense sod; blades narrow.
- 78a Blades rolled; salt crystals often on blades; lower culms and rhizomes conspicuously shiny.
.....32. *Distichlis stricta*
- 78b Blades flat, the older ones often curled; salt deposits wanting; culms and rhizomes not as above.
.....21. *Bouteloua gracilis*
- 77b Plants without rhizomes; blades 4-5 mm wide.43. *Leptochloa dubia*
- 76b Blades glabrous.
- 79a Sheaths pubescent on the margin or summit.
- 80a Nodes and internodes glabrous; collar margins distinctly tufted, culms round.
.....71. *Sporobolus giganteus*
- 80b Nodes and internodes sparsely hairy; collar margin not tufted; culms flat.
.....65. *Setaria macrostachya*
- 79b Sheaths glabrous.
- 81a Culms branched, blades 12-15 cm long
.....35. *Eragrostis lehmanniana*
- 81b Culms simple, blades 45-60 cm long.
.....72. *Sporobolus wrightii*
- 75b Ligule membranous, sometimes ciliate.
- 82a Leaf folded in the bud; veins prominent ventrally. Small bunchgrass.
.....42. *Koeleria cristata*
- 82b Leaf rolled in the bud.
- 83a Culms branched.
- 84a Sheaths and nodes pubescent. Introduced grass.
.....35. *Eragrostis lehmanniana*

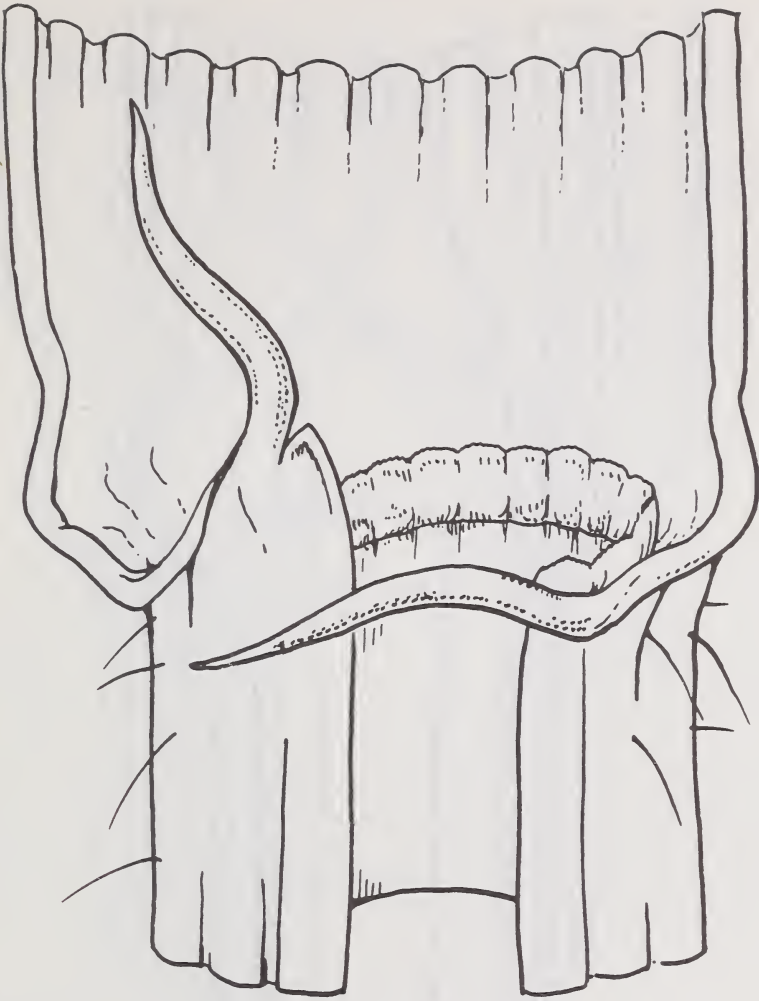
- 84b Sheaths and nodes glabrous.
 - 85a Wiry decumbent bunchgrass, often clambering over shrubs; blades 3-8 cm long.
.....49. *Muhlenbergia porteri*
 - 85b Erect bunchgrass, blades 15-30 cm long.
.....57. *Pappophorum mucronulatum*
- 83b Culms not branched.
 - 86a Nodes pubescent; ligule obtuse-lacerate.
.....74. *Stipa pringlei*
 - 86b Nodes glabrous; ligule truncate-ciliate.
.....34. *Eragrostis intermedia*
- 74b Panicle partly or wholly covered by the sheath.
 - 87a Culm branched.69. *Sporobolus asper*
 - 87b Culms not branched.....70. *Sporobolus cryptandrus*

DESCRIPTIONS OF SPECIES



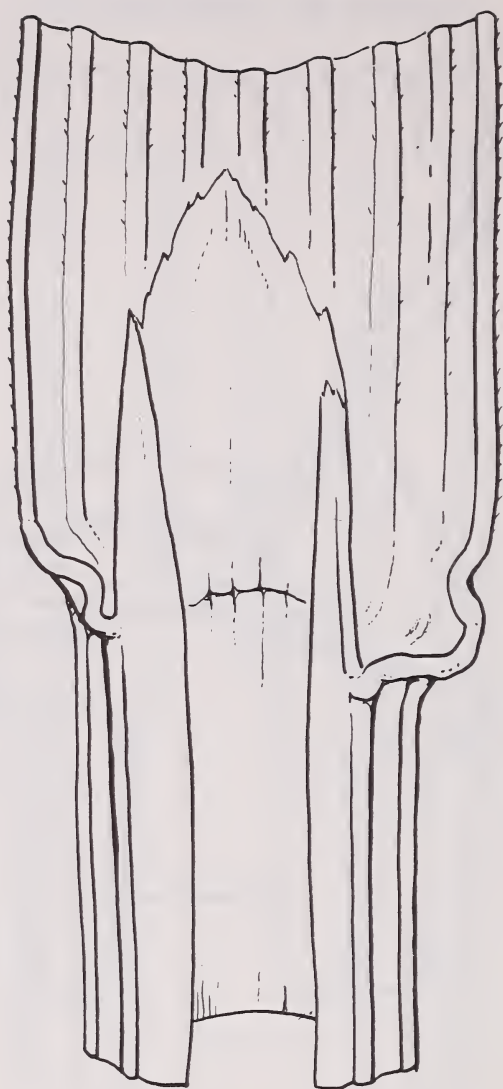
1. *Agropyron desertorum* (Fisch.) Schult. CRESTED WHEATGRASS

Erect, medium size bunchgrass. Vernation — Curled. Blades — Flat, 2-5 mm wide, 8-20 cm long; semi-erect; rough ventrally; veins each side of midrib usually three; ribs prominent dorsally, 12-18; blade margin toothed. Auricle — Small, often rudimentary. Ligule — Membranous, collar-like, $\frac{1}{2}$ mm long. Collar — Glabrous. Sheath — Glabrous, papery margin. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Round, unbranched. Outstanding Characters — Small auricle, growth in very early spring.



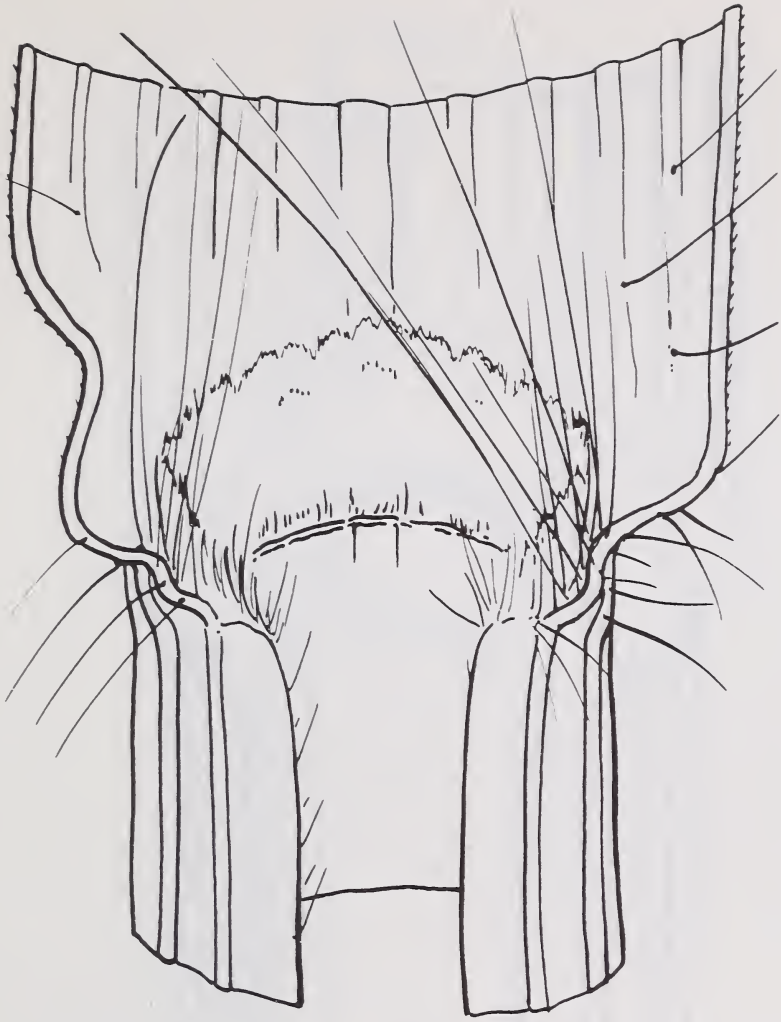
2. *Agropyron smithii* Rydb. WESTERN WHEATGRASS

Erect, individual plants to an open sodgrass. Vernation — Curled. Blades — Usually rolled blue-green, erect, narrow pointed; rough dorsally, pubescent ventrally; veins each side of midrib, 6-8; ribs prominent ventrally; margin toothed, midrib not prominent; 2-3 mm wide, 5-15 cm long. Auricle — Small, $\frac{1}{4}$ - $\frac{1}{2}$ mm, usually brownish-red. Ligule — Collar-like (membranous), small, $\frac{1}{4}$ - $\frac{1}{2}$ mm; truncate-toothed. Collar — Smooth, divided. Sheath — Smooth, round, veined; lower pinkish to red. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous, rhizomatous. Culm — Round, not branched. Outstanding Characters — Auricles small, blade ribs prominent dorsally, growth usually sod, blade color usually a blue-green.



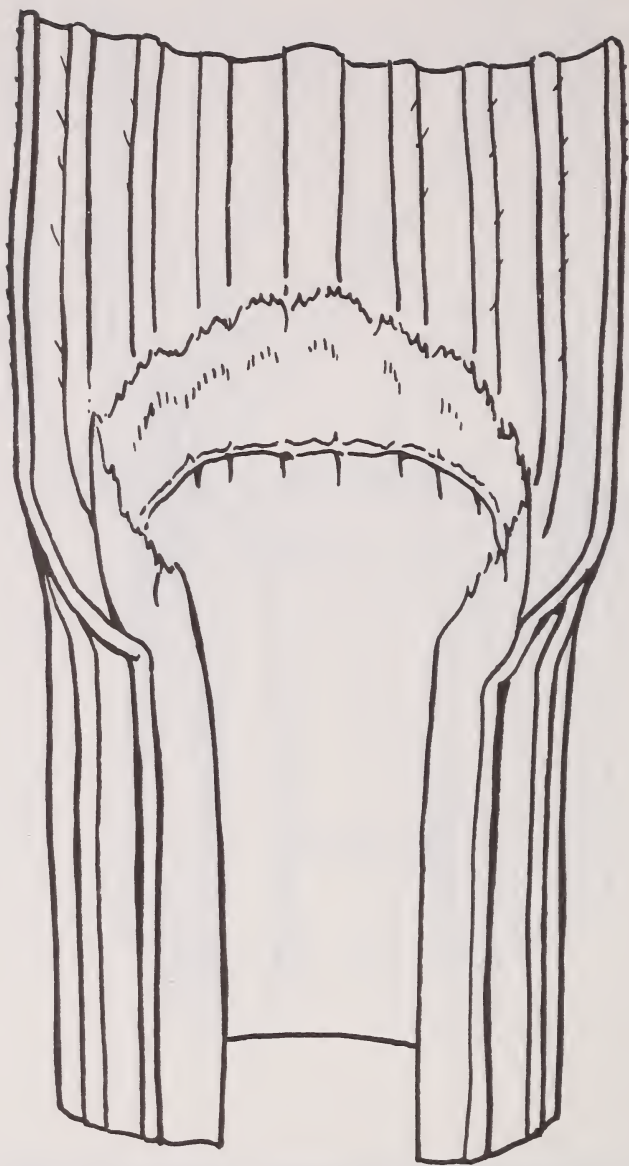
3. *Agrostis alba* L. REDTOP

Erect, open sod. Vernation — Folded (also reported as curled). Blades — Flat, erect, narrow, pointed, wider at base; rough ventral and dorsal; veins each side midrib, 3; ribs prominent dorsally and ventrally; margin toothed; midrib prominent dorsally; 3-5 mm wide, 3-8 cm long. Auricle — None. Ligule — Membranous, small, 1-3 mm, obtuse-entire to slightly toothed. Collar — Glabrous, divided. Sheath — Glabrous, round, frequently purplish-red. Nodes — Glabrous. Internodes — Glabrous. Roots — Rhizomatous. Culm — Round, occasionally branched. Outstanding Characters — Ligule small, 1-2 mm; obtuse-entire, blades flat, wide tapered to point, glabrous, culm frequently reddish-purple at maturity, rhizomatous.



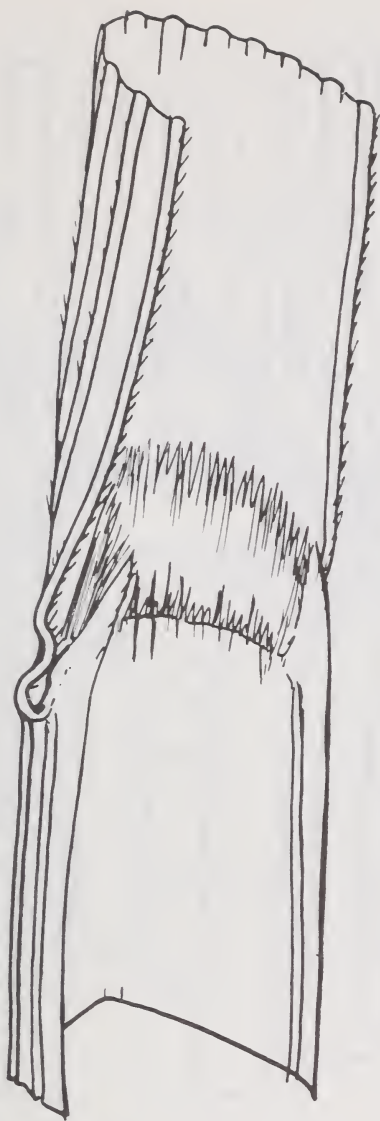
4. *Andropogon barbinodis* Lag. CANE BLUESTEM

Erect, small bunchgrass. Vernation — Curled. Blades — Flat, narrow, pointed; reddish; rough ventrally and dorsally; margin white, toothed; midrib prominent dorsally; 2-5 mm wide, 8-20 cm long. Auricle — None. Ligule — Membranous, 2-3 mm, obtuse-lacerate, occasionally long hairs on back, 3-5 mm. Collar — Smooth, divided. Sheath — Round, reddish, smooth, hyaline margin, veined. Nodes — Woolly. Internodes — Glabrous. Roots — Fibrous. Culm — Round, usually branched, reddish. Outstanding Characters — Blade margin white; nodes woolly, culms large, usually branched. Mature plants usually reddish. Panicle large, cotton-like, awned.



5. *Andropogon cirratus* Hack. TEXAS BLUESTEM

Erect, small bunchgrass. Vernation — Folded. Blades — Old, flat; new, folded; erect, narrow, pointed; veins each side of midrib 2-3; midrib prominent dorsally; 2-4 mm wide, 12-20 cm long. Auricle — None. Ligule — Membranous, small, 1-2 mm, obtuse-entire. Collar — Glabrous. Sheath — Glabrous, round. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Round, sparingly branched. Outstanding Characters — Old growth blades usually flat. New growth blades folded, long, narrow.



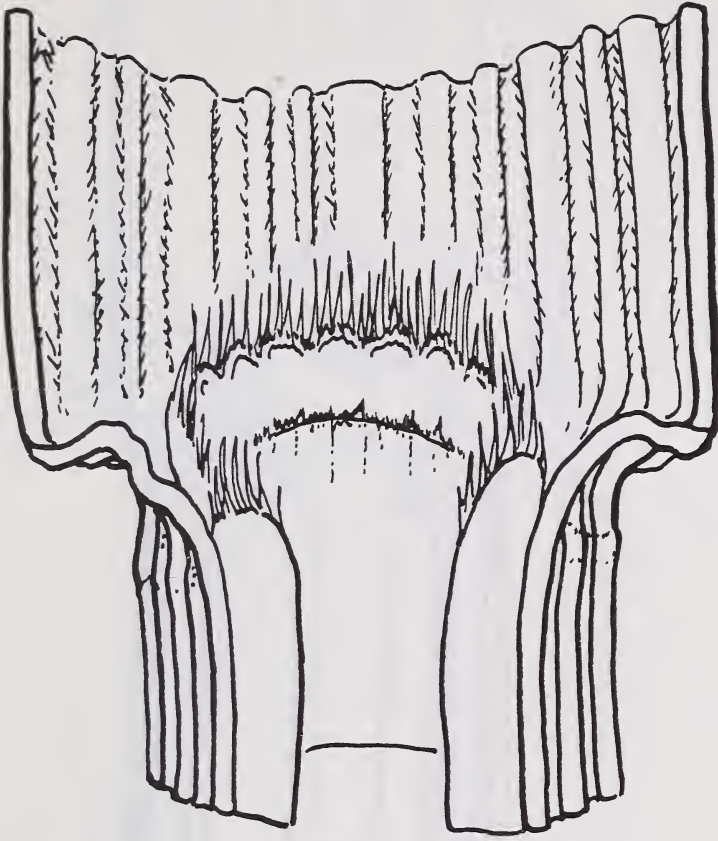
6. *Andropogon scoparius* Michx. LITTLE BLUESTEM

Erect, medium to large bunchgrass. Vernation — Folded. Blades — Flat to folded, narrow, drooping, pointed; rough, margin toothed; veins each side of midrib usually 4; ribs prominent ventrally and dorsally; midrib prominent dorsally; 2 mm wide, 5-20 cm long. Auricle — None. Ligule — Collar-like (membranous), small, $\frac{1}{2}$ mm, occasionally to 2 mm, obtuse, finely lacerate. Collar — Glabrous, very small. Sheath — Glabrous, flat, occasionally pinkish. Nodes — Glabrous, reddish-brown at maturity. Internodes — Glabrous. Roots — Fibrous, Culm — Flat. Outstanding characters — Blades usually folded, long and narrow, twisted. Stems elliptical to flat. Ligule very small and difficult to observe.



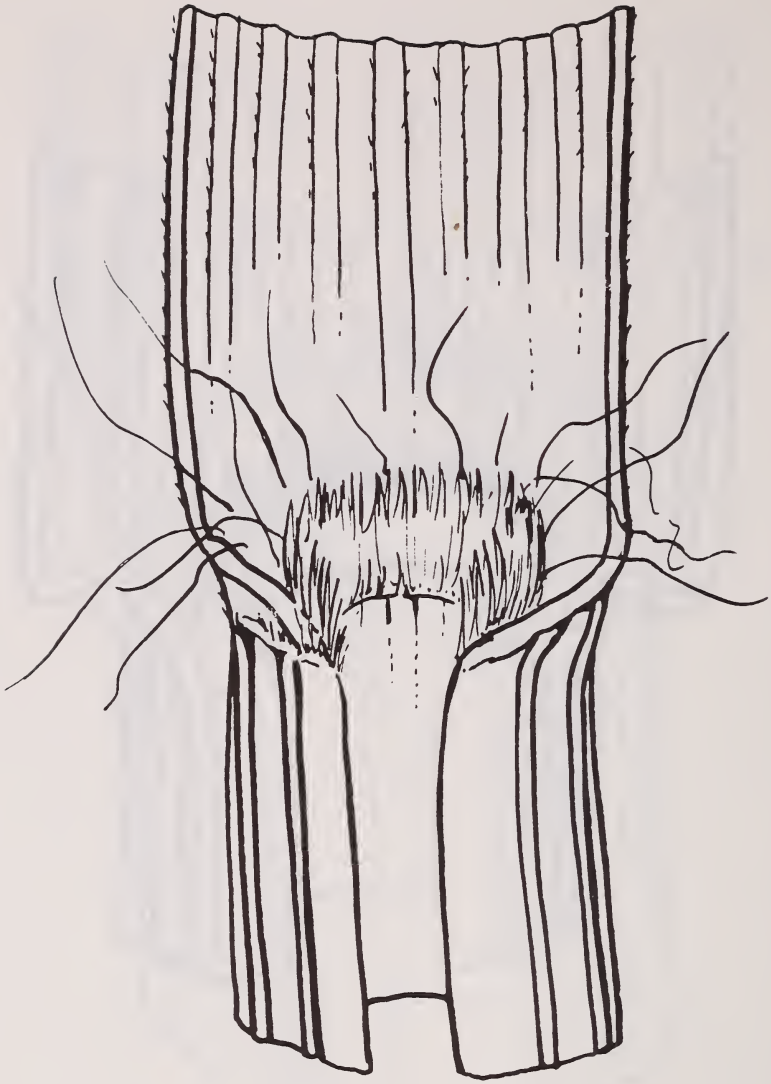
7. *Aristida adscensionis* L. SIXWEEKS THREE-AWN

Annual, erect, small bunchgrass. Vernation — Folded. Blades — Flat, narrow, short; glabrous, soft; veins each side of midrib, 3-4; ribs not prominent; margin glandular hairs at base; midrib not prominent; $\frac{1}{2}$ -1 mm wide, 1-2½ cm long. Auricle — None. Ligule — Hairy, small $\frac{1}{2}$ mm, long hairs, 2-3 mm. Collar — Hairy margin, glandular, 2-3 mm. Sheath — Occasional hairs, papery margin. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous, superficial. Culm — Round, frequently branched. Outstanding Characters — Annual. Collar with glandular hairs. Ligule hairy, very small $\frac{1}{2}$ mm. Roots superficial. Blades narrow, short, usually margin glandular hairs. At maturity usually blown away. Awns, 1-2 cm.



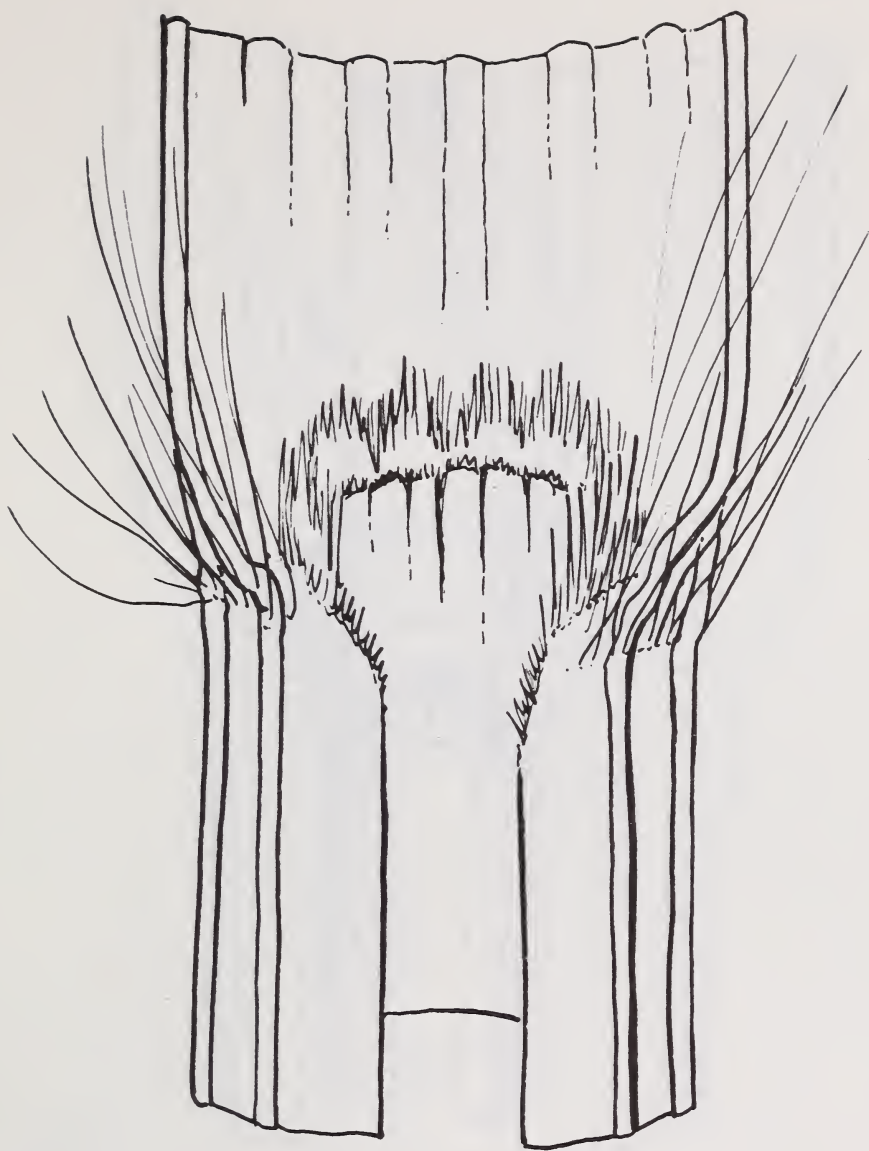
8. *Aristida divaricata* Humb. & Bonpl. POVERTY THREE-AWN

Erect, small bunchgrass. Vernation — clasped. Blades — Rolled, erect, narrow, pointed; smooth; ribs prominent ventrally; margin toothed; midrib not prominent; $\frac{1}{2}$ -1 mm wide, 5-15, occasionally 25 cm long. Auricle — None. Ligule — Hairy, small $\frac{1}{2}$ -1 mm. Collar — Bearded, 1-2 mm. Sheath — Glabrous, veined. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Elliptical, not branched. Outstanding Characters — Collar and ligule bearded. Blades narrow, rolled, thread-like. Awns short 10-15 mm.



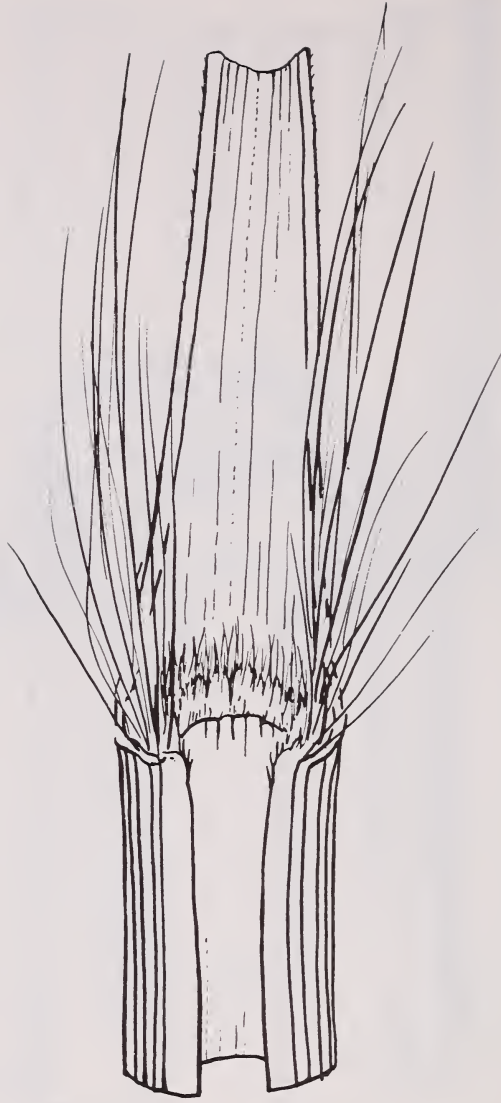
9. *Aristida glabrata* (Vasey) Hitchc. SANTA RITA THREE-AWN

Erect, small bunchgrass. Vernation — clasped. Blades — Hairy ventrally on lower $\frac{1}{4}$, 2-3 mm ; veins each side of midrib, 3; ribs prominent ventrally and dorsally; margin glabrous; midrib not prominent; 1 mm wide, 5-18 cm. long. Auricle — None. Ligule — Hairy, small $\frac{1}{2}$ -1 mm , occasional hairs 2-3 mm. Collar — Glabrous, divided. Sheath — Glabrous, veined, papery margin. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Elliptical, strongly branched. Outstanding Characters — Blades long, narrow, usually rolled. Ligule hairy, small, and scattered hairs, 2-3 mm. Blades scattered hairs, 2-3 mm dorsally, Awns, 2-4 cm. Culms branched.



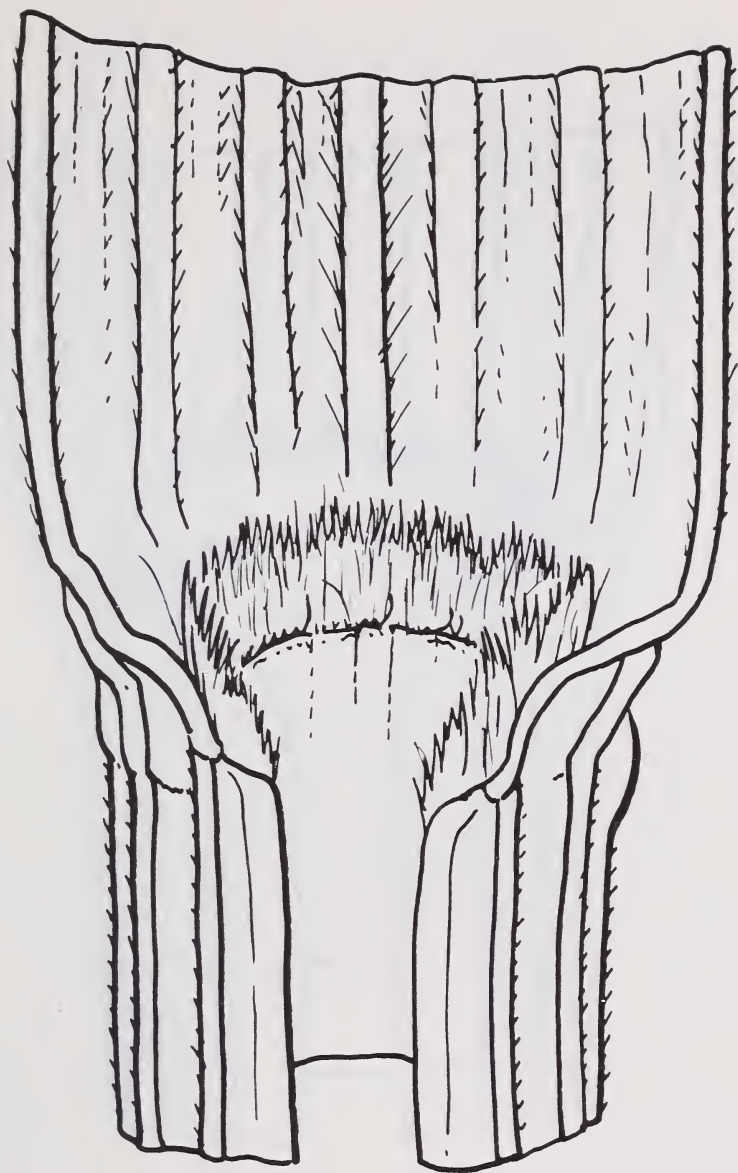
10. *Aristida glauca* (Nees) Walp. BLUE THREE-AWN

Erect, medium bunchgrass. Vernation — Clasped. Blades — Rolled, narrow, pointed; usually glabrous, stiff; veins and ribs indistinct; margin smooth; midrib prominent; $\frac{1}{3}$ mm wide, 15-25 cm long. Auricle — None. Ligule — A collar, small $\frac{1}{4}$ - $\frac{1}{2}$ mm, truncate-ciliate. Collar — Ciliate front margin divided. Sheath — Round, glabrous. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Round, usually branched. Outstanding Characters — Blades rolled, narrow, long, pointed. Culms usually branched. Ligule ciliate, short. Awns 2-4 cm long.



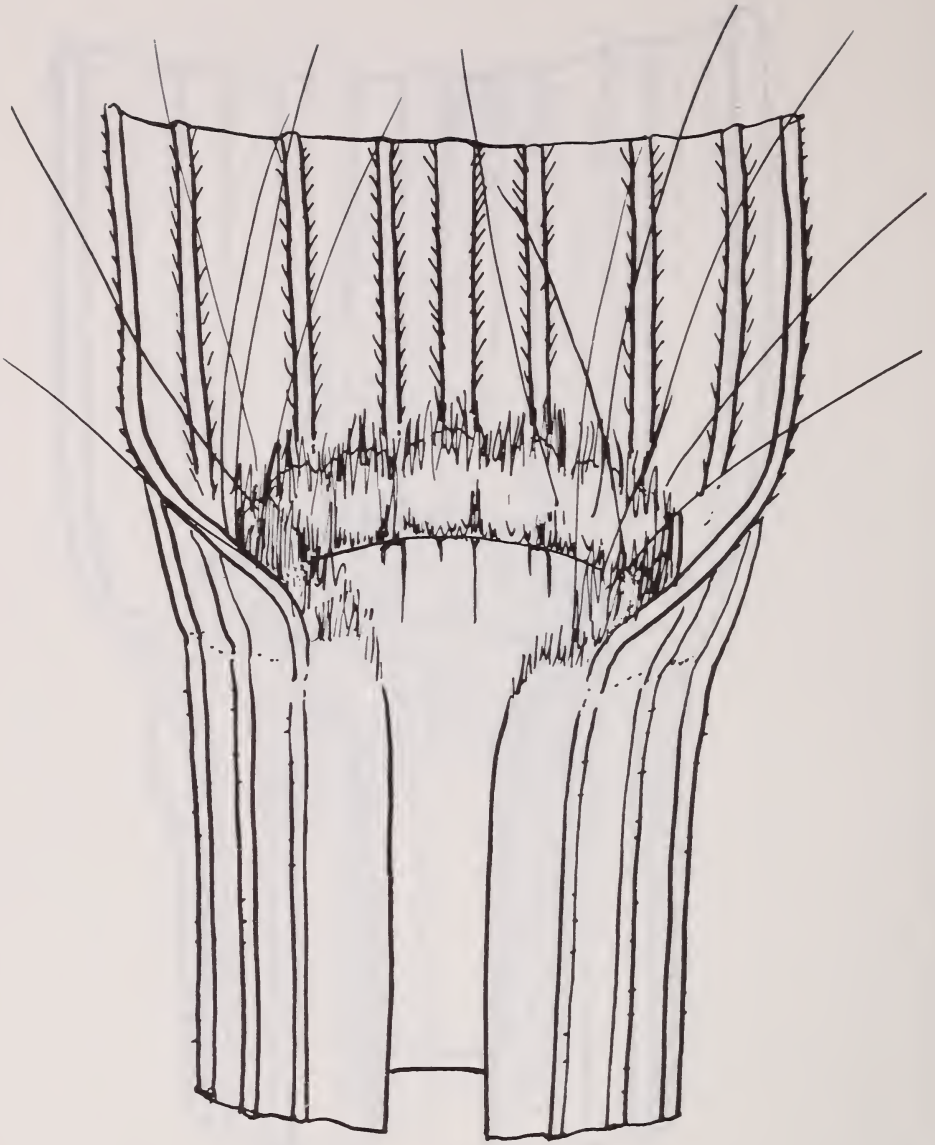
11. *Aristida longiseta* Steud. RED THREE-AWN

Erect, small bunchgrass. Vernation — clasped. Blades — Rolled, narrow, long; rough ventrally, stiff; ribs not prominent; margin toothed; midrib not prominent; 1 mm wide, 10-20 cm long. Auricle — None. Ligule — Hairy, tufted, 1-2 mm. Collar — Hairy margin, divided. Sheath — Round, veined, glabrous, papery margin. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Round, not branched. Outstanding Characters — Blades rolled, narrow, long. Ligule hairy, tufted, 1-2 mm. Awn 5-8 cm. long.



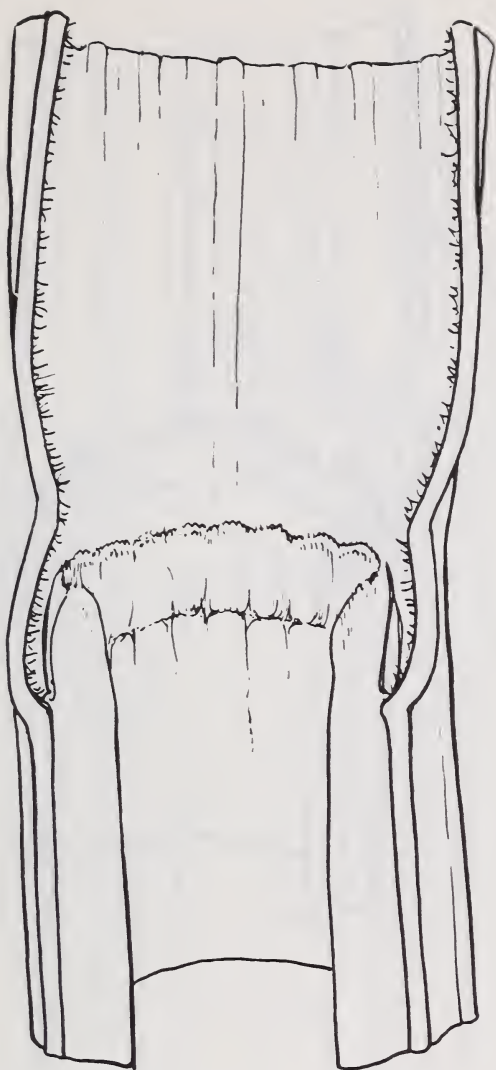
12. *Aristida purpurea* Nutt. PURPLE THREE-AWN

Erect, small bunchgrass. Vernation — Folded. Blades — Rolled, curved, pointed; rough dorsally and ventrally, occasionally hairy; ribs indistinct; margin occasionally hairy, $\frac{1}{2}$ mm wide, 2-8 cm long. Auricle — None. Ligule — Hairy, 1-1½ mm. Collar — Hairy margin, bearded. Sheath — Glabrous, round. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Elliptical, not branched. Outstanding Characters — Blades rolled, thread-like, curved, short. Collar bearded. Ligule conspicuous hairs. Awns purple, 2-5 cm.



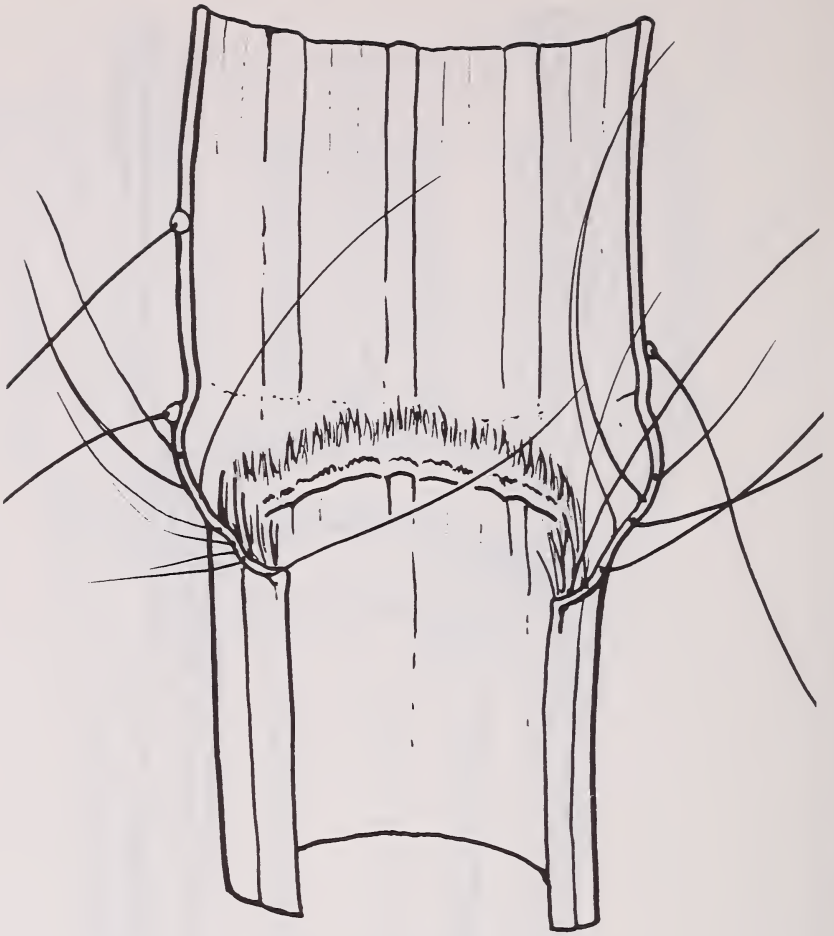
13. *Aristida ternipes* Cav. SPIDERGRASS

Erect, small bunchgrass. Vernation — Folded. Blades — Flat at base, tip rolled; rough, occasional hairs dorsally; veins each side of midrib, 2; ribs prominent ventrally and dorsally; margin toothed; midrib not prominent; 2 mm wide, 5-20 cm. long. Auricle — None. Ligule — Hairy, small 1 mm. Collar — Hairy margin, 1 mm, divided. Sheath — Glabrous, papery margin. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Elliptical, occasionally branched. Outstanding Characters — Blades flat at base, narrow, long, ribbed. Ligule hairy, small. Collar hairy margin. Awns, 1 long and 2 short.



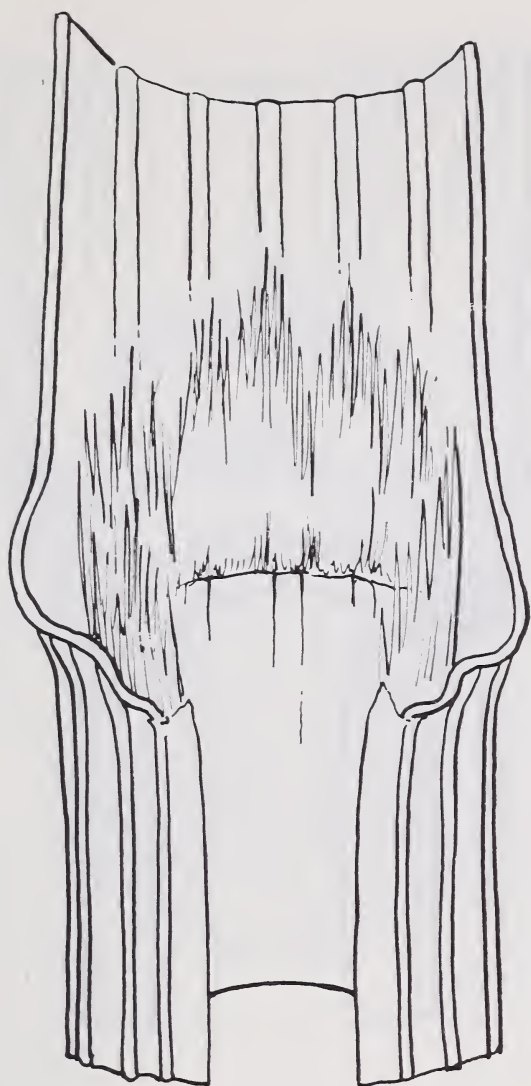
14. *Blepharoneuron tricholepis* (Torr.) Nash. PINE DROPSEED

Erect, small bunchgrass. Vernation — Folded. Blades — Usually rolled, narrow, pointed; rough, stiff, ribs indistinct; margin toothed; midrib not prominent; 1 mm wide, 5-10 cm long. Auricle — None. Ligule — Membranous, very small, 1 mm, truncate-entire. Collar — Glabrous. Sheath — Elliptical, glabrous, veined. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Round, not branched. Outstanding Characters — Blades long, narrow, usually rolled. Ligule small, truncate-entire. Few basal blades.



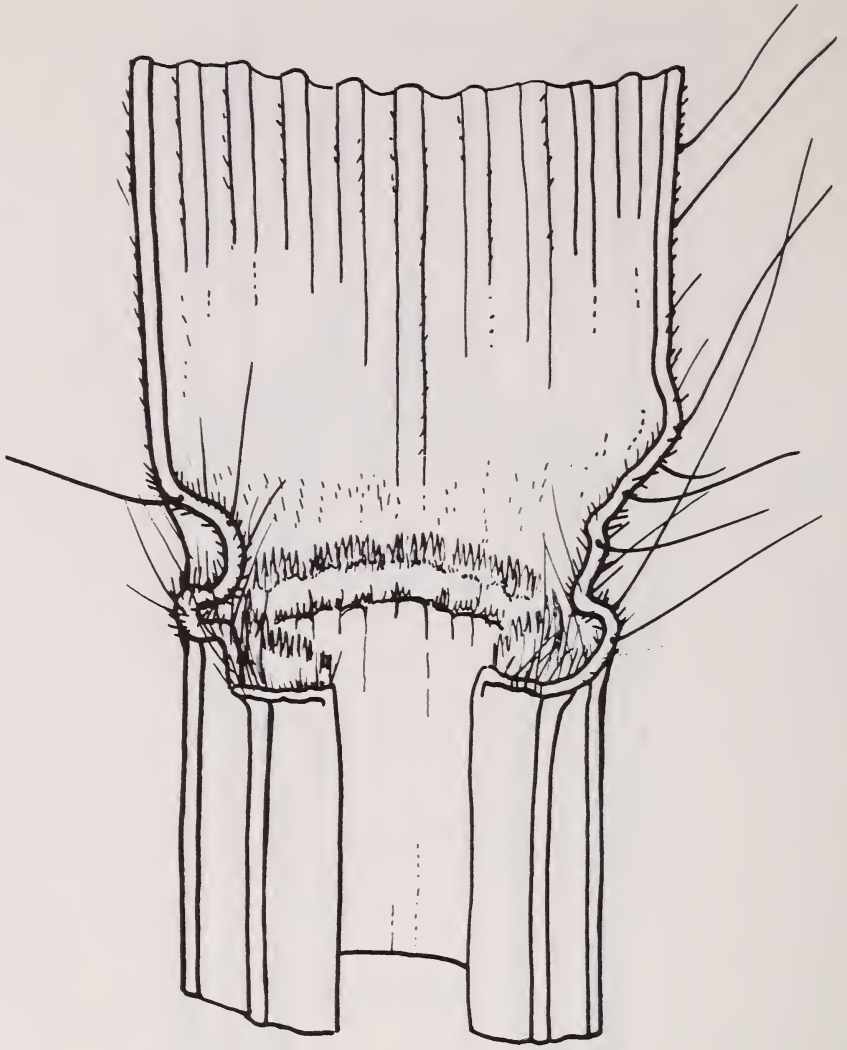
15. *Bouteloua aristidoides* (H.B.K.) Griseb. NEEDLE GRAMA

Annual semi-erect, small bunchgrass. Vernation — Curled. Blades — Flat, erect, narrow, pointed; blade hairy near collar; veins each side of midrib, 1-2; ribs indistinct; margin with glandular hairs near ligule, 2-4 mm ; midrib prominent ventrally; 1-2 mm wide, 2-7 cm long. Auricle — None. Ligule — Hairy, small $\frac{1}{2}$ mm. Collar — Glabrous. Sheath — Glabrous, veined, elliptical. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Elliptical, branched. Outstanding Characters — Annual. Ligule hairy. Blade margin glandular hairs. Stems branched. Awns short.



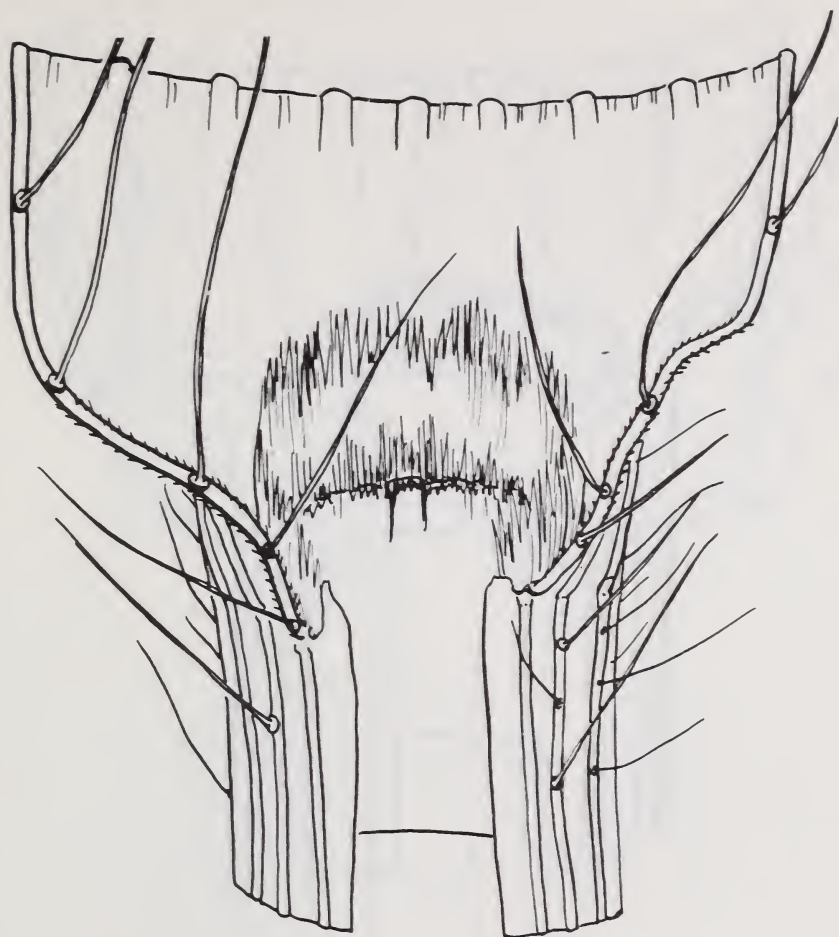
16. *Bouteloua barbata* Lag. SIXWEEKS GRAMA

Annual, erect, small bunchgrass. Vernation — Curled. Blades — Flat, narrow, short; glabrous; veins each side of midrib, 2; ribs not prominent; margin glabrous; midrib not prominent; 1 mm wide, 2-4 cm long. Auricle — None. Ligule — Hairy, small 1 mm. Collar — Glabrous. Sheath — Glabrous, veined, margin papery. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Branched, round. Outstanding Characters — Annual. Roots superficial, blows away at maturity. Ligule hairy. Blades flat, narrow, short. Sheath margin papery. Awns short.



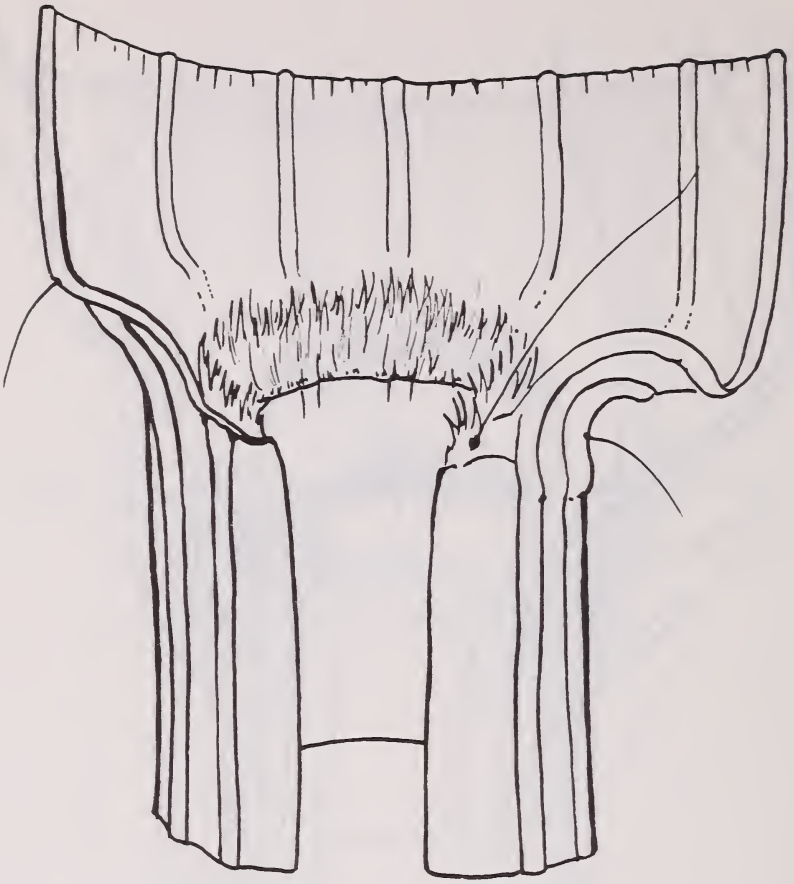
17. *Bouteloua chondrosioides* (H.B.K.) Benth. SPRUCETOP GRAMA

Erect, small bunchgrass. Vernation — Clasped. Blades — Flat, drooping, narrow, pointed; occasionally hairy ventrally and dorsally; veins each side of midrib, 4; ribs numerous, prominent ventrally and dorsally; margin with glandular hairs, midrib prominent ventrally; 2 mm wide, 5-15 cm long. Ligule — Hairy, $\frac{1}{4}$ mm. Collar — Hairy dorsally, margin divided. Sheath — Round, veined, glabrous. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Round, not branched. Outstanding Characters — Glandular hairs on blade margin, dorsally and occasionally ventrally. Ligule hairy, small $\frac{1}{4}$ mm. Spikelet villous, short and broad.



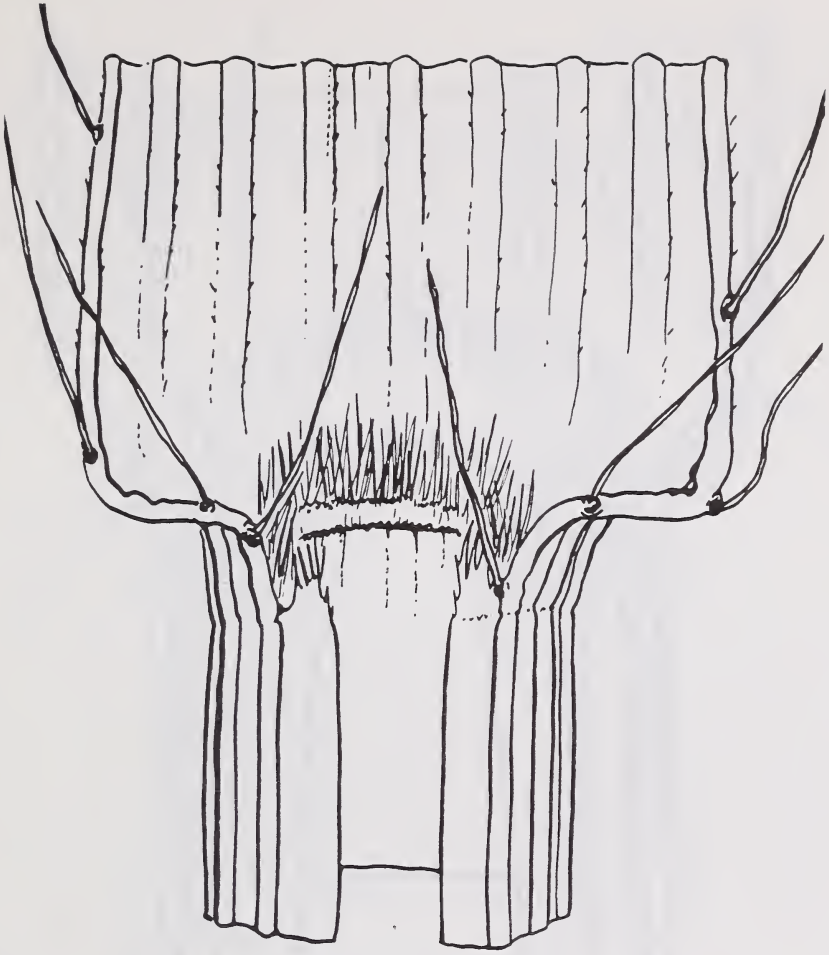
18. *Bouteloua curtipendula* (Michx.) Torr. SIDEOTS GRAMA

Erect, large bunchgrass. Vernation — Curled. Blades — Flat, long, drooping, narrow, pointed; rough dorsally; veins each side of midrib, 2-3; ribs not prominent; margin toothed, glandular hairs; midrib not prominent; 2-3 mm wide, 5-20 cm long. Auricle — None. Ligule — Membranous, small 1 mm., truncate-lacerate. Collar — Hairy margin and occasionally glandular. Sheath — Glabrous, veined, papery margin. Nodes — Glabrous. Internodes — Glabrous. Roots — Short rhizomes. Culm — Elliptical to round occasionally branched. Outstanding Characters — Blade and collar margins with conspicuous glandular hairs. Rachis zigzag. Mature plants reddish-brown.



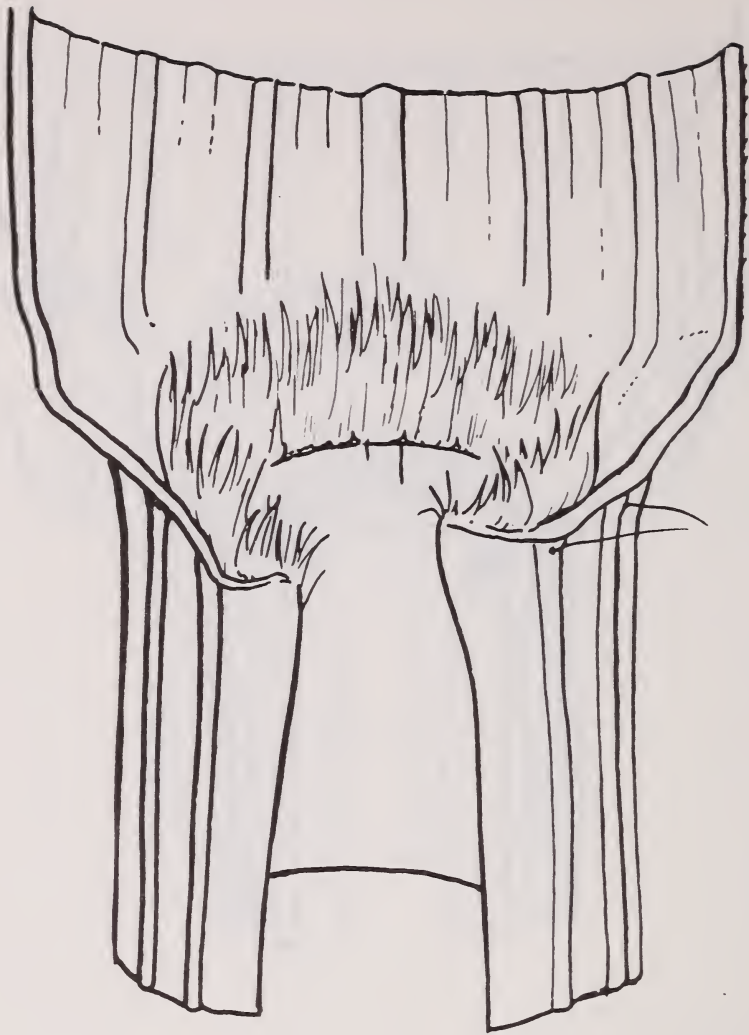
19. *Bouteloua eriopoda* Torr. BLACK GRAMA

Erect to generally decumbent. Vernation — Curled. Blades — Flat, narrow, drooping, pointed; soft, hairy ventrally; veins each side of midrib, usually 2; rib not prominent; margin glandular hairs, 3-5 mm, midrib not prominent; 1-2 mm wide, 3-8 cm long. Auricle — None. Ligule — Hairy, small, $\frac{1}{2}$ mm. Collar — Glabrous or with scattered hairs. Sheath — Round, glabrous. Nodes — Sparsely pubescent to glabrous. Internodes — Woolly. Roots — Fibrous. Culm — Round, branch at node, woolly. Outstanding Characters — Blade margin glandular hairs. Internodes canescent. Culm roots at nodes and produces new plants. Old plants surrounded by new plants connected with stolons. Lower stems remain green year long.



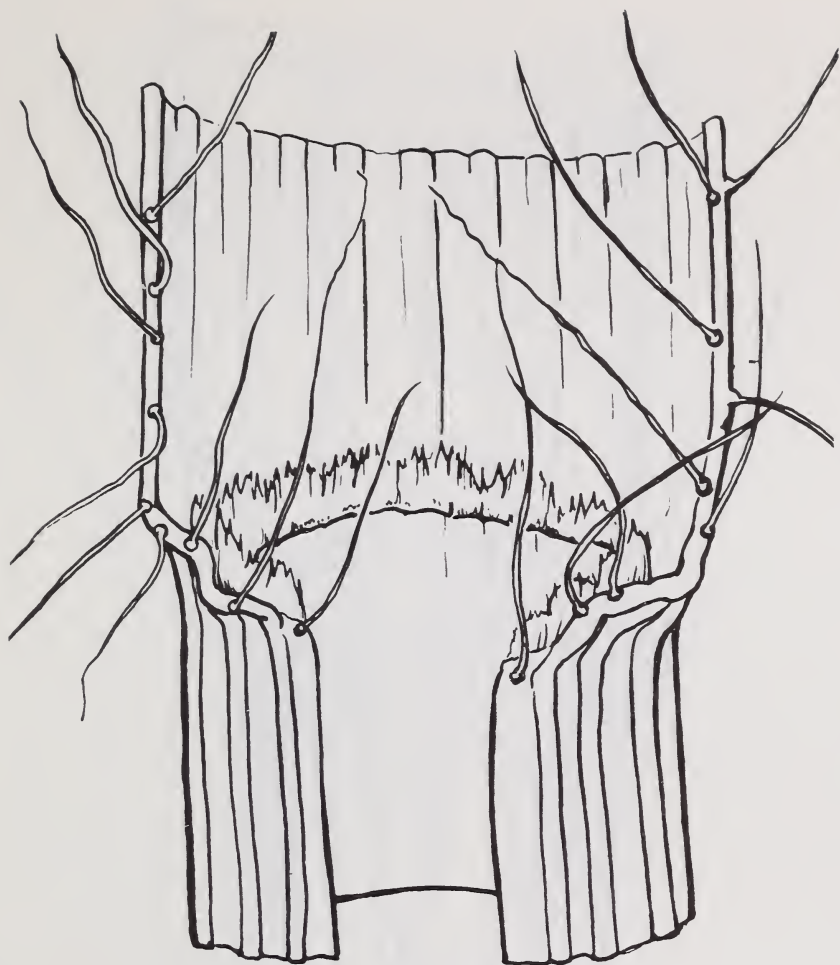
20. *Bouteloua filiformis* (Fourn.) Griffiths. SLENDER GRAMA

Erect, small bunchgrass. Vernation — Curled. Blades — Flat, narrow, pointed; margin rough, glandular hairs; veins each side of midrib, 2-3; ribs prominent (with lens) ventrally and dorsally, midrib prominent ventrally; 1-2 mm wide, 5-8 cm long. Auricle — None. Ligule — Hairy, small $\frac{1}{2}$ mm, ciliate. Collar — Hairy margin. Sheath — Glabrous, papery margin. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Elliptical, not branched. Outstanding Characters — Blade margin glandular hairs. Ligule ciliate, small $\frac{2}{3}$ mm. Blades narrow, long.



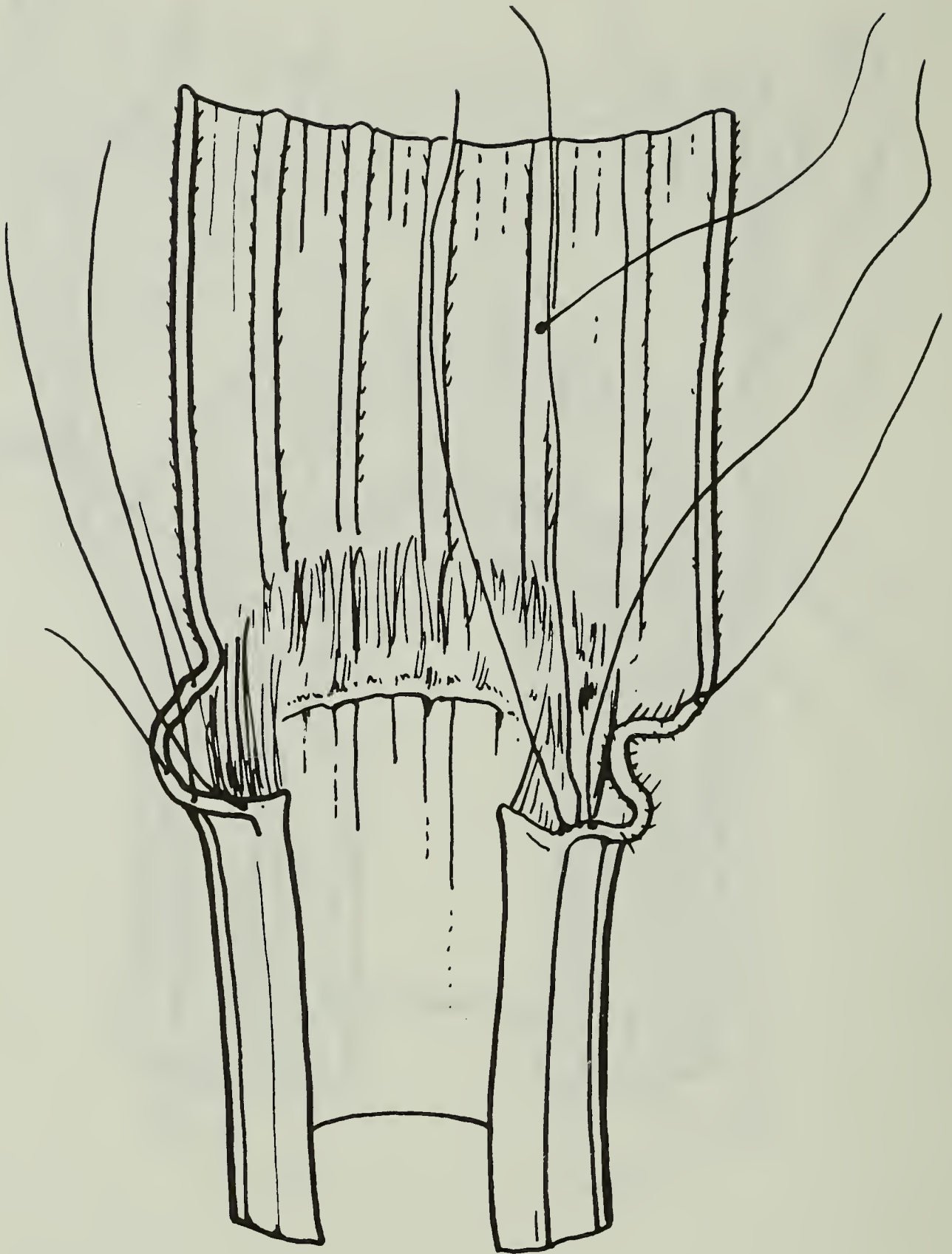
21. *Bouteloua gracilis* (H.B.K.) Lag. BLUE GRAMA

Erect, open sod or mat. Vernation — Clasped. Blades — Flat, drooping, narrow, pointed; rough ventrally, veins each side of midrib usually 2; veins prominent ventrally and dorsally, margin toothed; sparsely pilose below; 2-3 mm wide, 5-15 cm long. Auricle — None. Ligule — Small $\frac{1}{2}$ mm mostly of hairs. Collar — Glabrous (smooth, not pubescent or hairy). Sheath — Round, glabrous, veined. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous, short rhizomes. Culm — Round, not branched. Outstanding Characters — Blade in bud clasped. Blades flat, narrow, long drooping, glabrous. Usually semi-sod. Old growth blades curled.



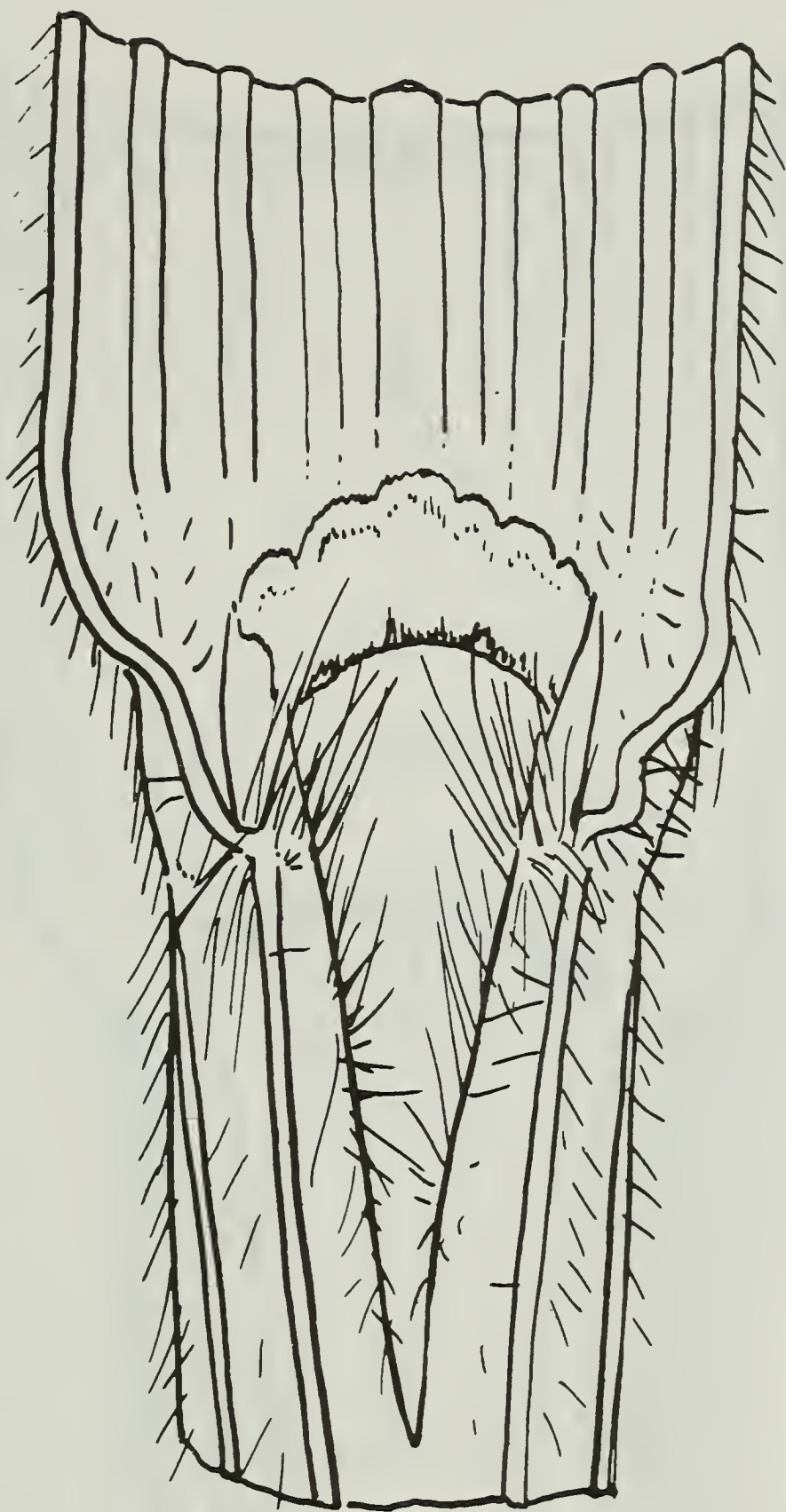
22. *Bouteloua hirsuta* Lag. HAIRY GRAMA

Erect, small bunchgrass. Vernation — Clasped. Blades — Flat, drooping, narrow, pointed; rough, hairy dorsally; veins each side of midrib, 3-4 ribs indistinct; margin glandular hairs; midrib not prominent; 1-3 mm wide, 3-10 cm long. Auricle — None. Ligule — Membranous, small $\frac{1}{4}$ mm. with occasional marginal hairs; truncate-ciliate. Collar — Hairy with glandular marginal hairs. Sheath — Veined, round with papery margin. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Not branched, round. Outstanding Characters — Blades margin with glandular hairs. Rachis extends beyond terminal spikelet. Collar margin with glandular hairs.



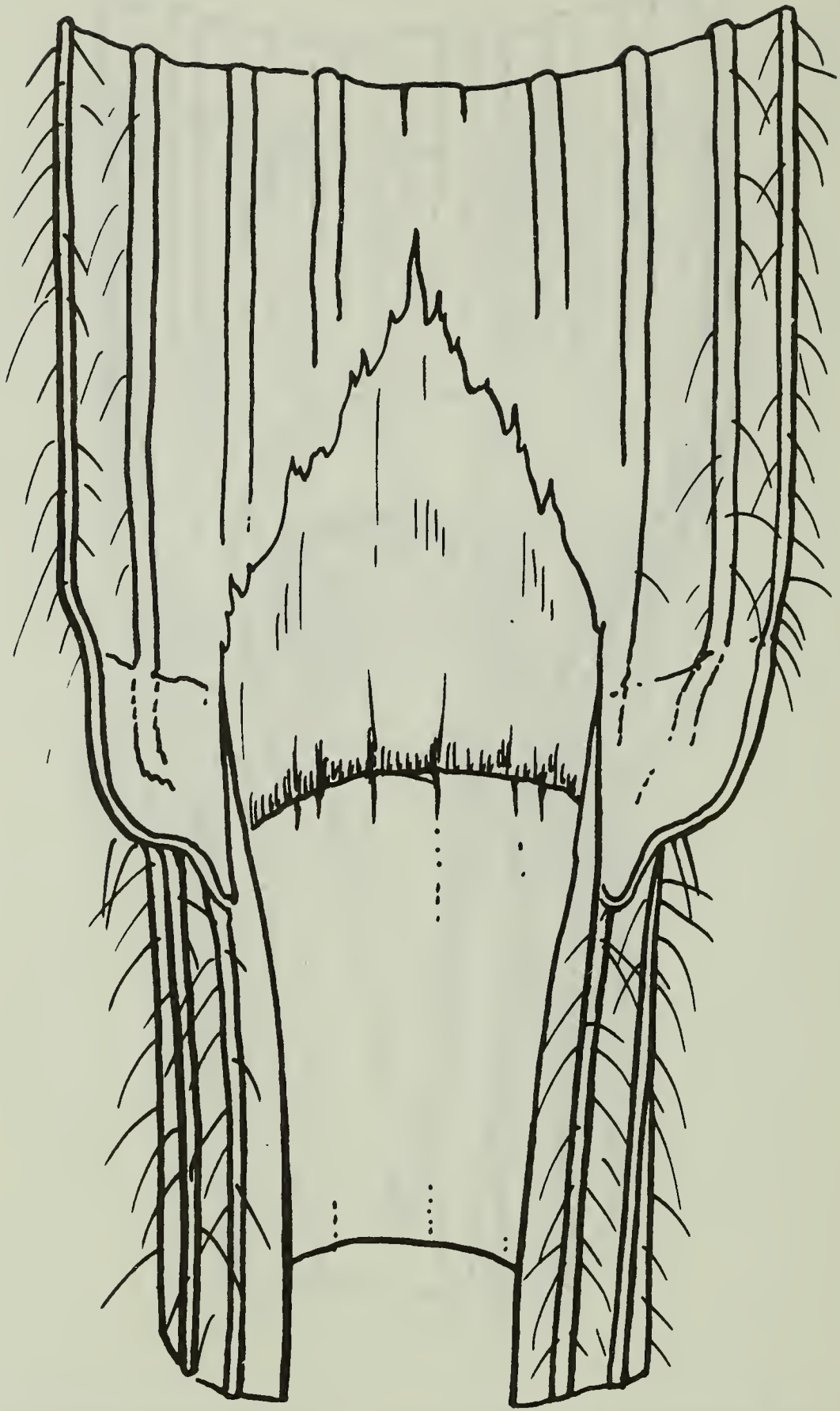
23. *Bouteloua rothrockii* Vasey. ROTHROCK GRAMA

Erect to semi-erect, small bunchgrass. Vernation — Curled. Blades — Flat, drooping, narrow, long, pointed; rough, hairy ventrally and dorsally; veins each side of midrib 2; ribs numerous, not prominent; margin glandular hairs, toothed; midrib prominent dorsally; 2 mm wide, 5-15 cm long. Auricle — None. Ligule — Hairy, tufted, 2-4 mm. Collar — Hairy margin, divided. Sheath — Glabrous, papery margin. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Round, not branched. Outstanding Characters — Glandular hairs on blade margin, dorsally and occasionally ventrally. Ligule and collar hairy. Spikelets 3-8, slender.



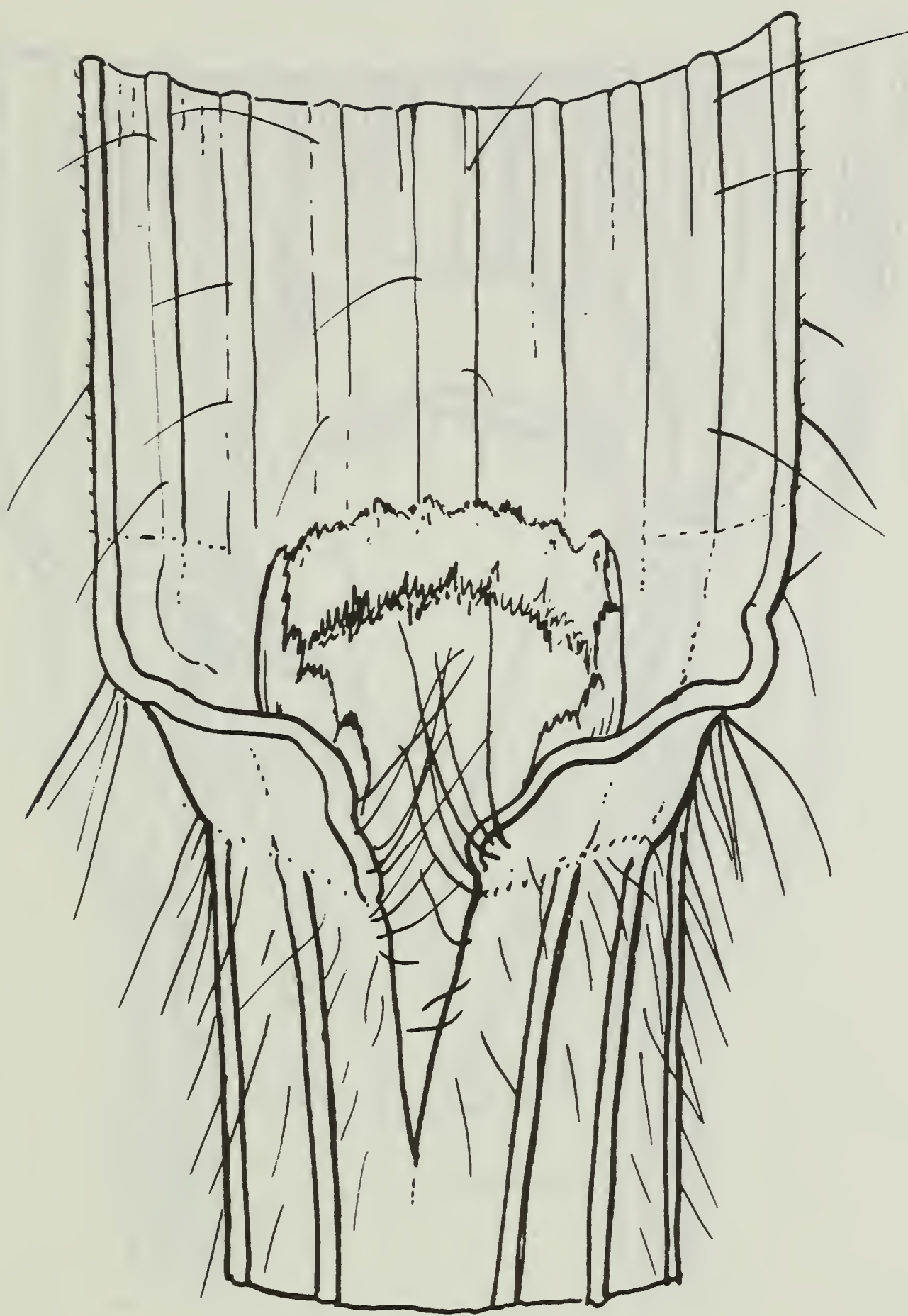
24. *Bromus anomalus* Rupr. NODDING BROME

Erect, small bunchgrass. Vernation — Curled. Blades — Flat, wide, long, drooping; occasionally hairy dorsally, 2-4 mm ; veins each side of midrib, 3; ribs prominent ventrally and dorsally; margin toothed; midrib prominent dorsally and ventrally; 2-8 mm. wide, 15-40 cm long. Auricle — None. Ligule — Membranous, small $\frac{1}{2}$ mm , truncate-toothed. Collar — Glabrous, divided. Sheath — Ribbed, generally closed, glabrous to hairy on margin, the lower sheaths sometimes retrorsely hispid. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Elliptical, not branched. Outstanding Characters — Sheath usually closed completely. Blades flat and sheath with prominent ribs. Blades wide, long, drooping. Ligule membranous, $\frac{1}{2}$ mm truncate-toothed. Blade midrib prominent dorsally and ventrally.



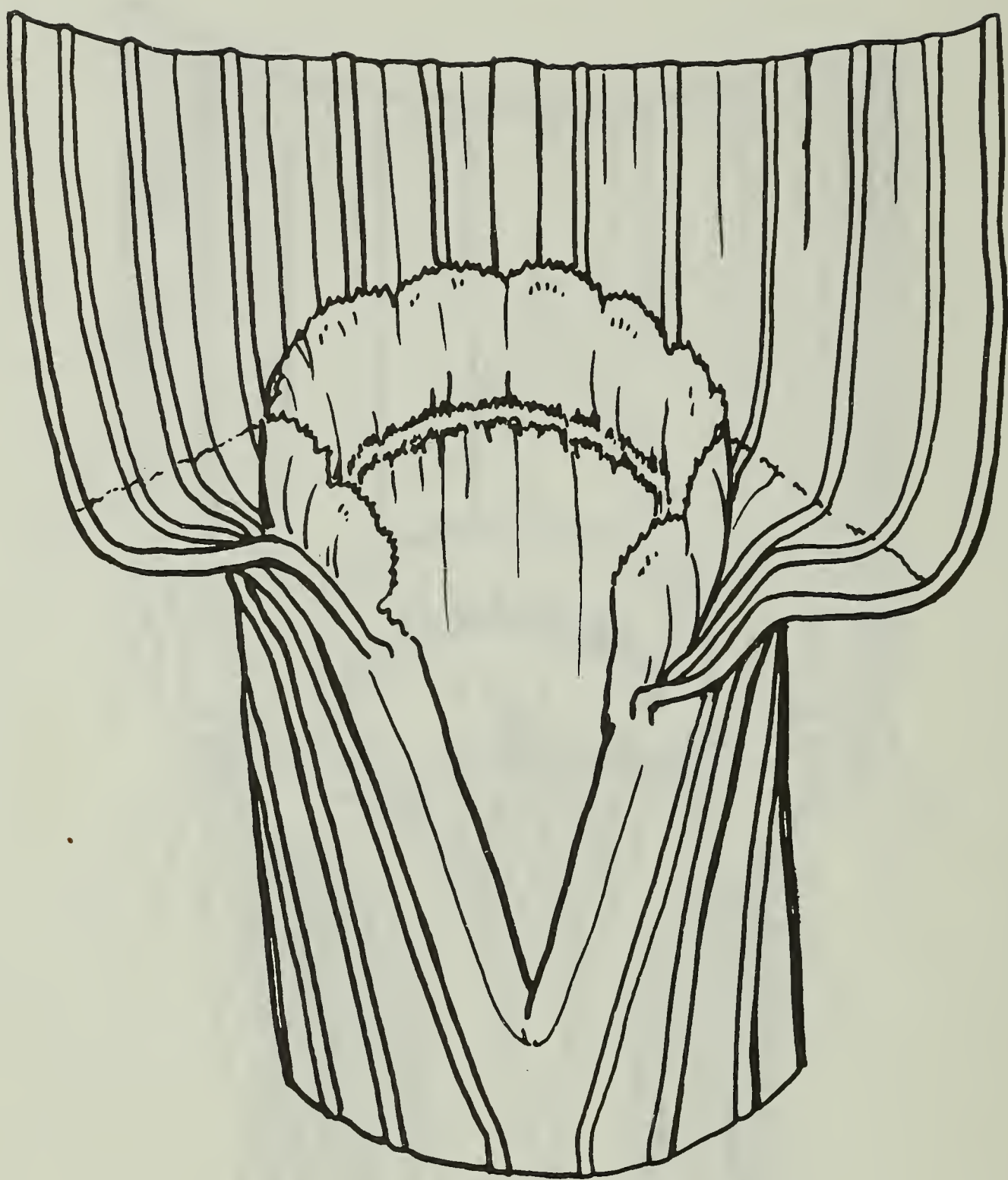
25. *Bromus arizonicus* (Shear.) Stebbins. ARIZONA BROME

Erect, annual. Vernation — Curled. Blades — Flat, wide, long; hairy ventrally and dorsally; veins each side of midrib, 2-3; ribs prominent ventrally and dorsally; margin hairy; midrib prominent dorsally; 4-6 mm wide, 10-20 cm long. Auricle — None. Ligule — Membranous, hyaline, large 2-5 mm, obtuse-lacerate. Collar — Glabrous, divided. Sheath — Closed, hairy. Nodes — Glabrous. Internodes — Glabrous, veined. Roots — Fibrous, annual. Culm — Round, not branched. Outstanding Characters — Annual. Sheath closed. Blades hairy. Ligule hyaline, large 2-5 mm, obtuse-lacerate. Awns, 5-10 mm.



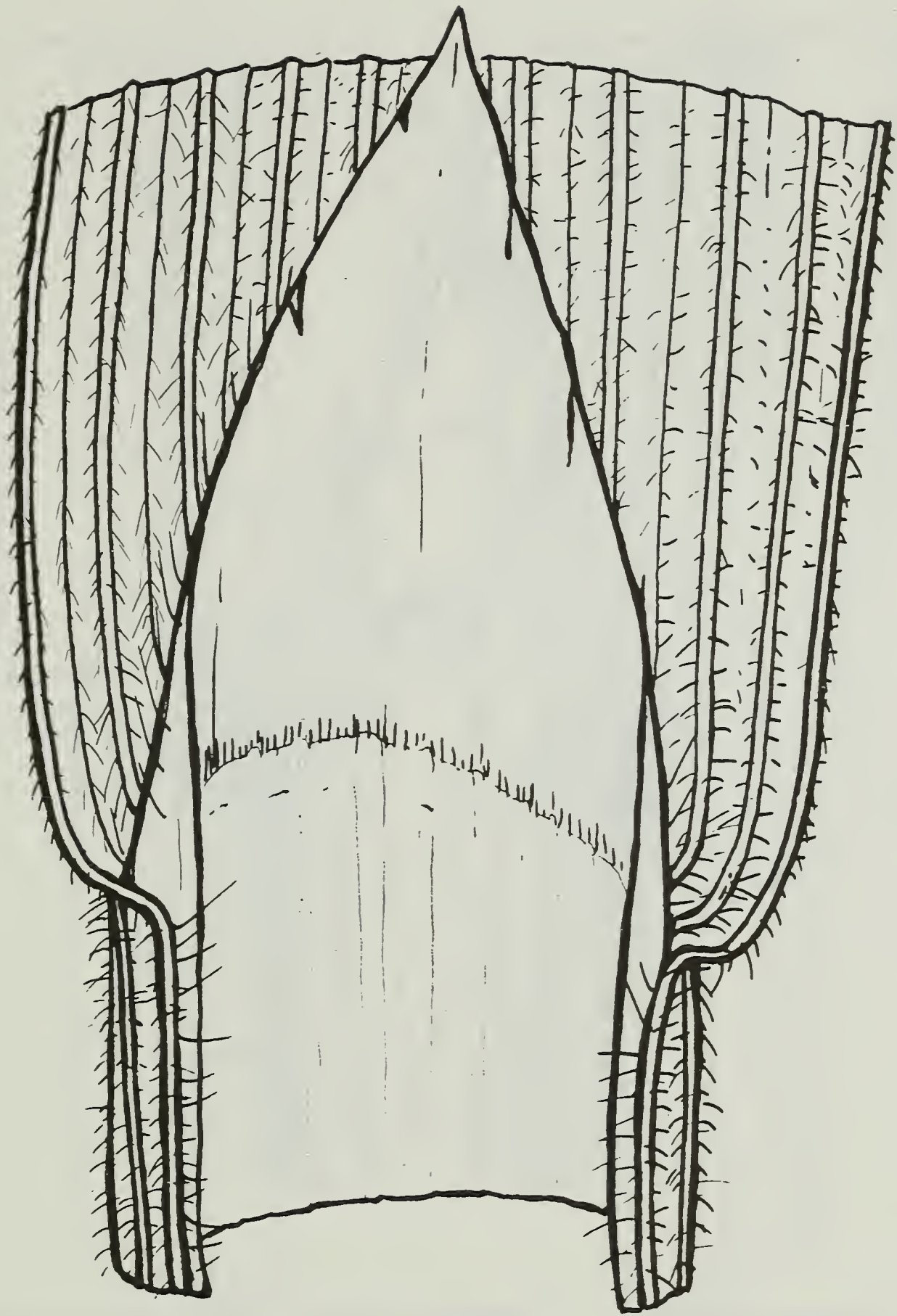
26. *Bromus ciliatus* L. FRINGED BROME

Erect, small bunchgrass, panicle drooping. Vernation — Curled. Blades — Flat, narrow, long, drooping; hairy; veins each side of midrib, 2-3; ribs prominent ventrally and dorsally; midrib prominent dorsally and ventrally; 2-8 mm wide, 15-30 cm long. Auricle — None. Ligule — Membranous, small $\frac{2}{3}$ -1 mm, truncate-notched. Collar — Hairy on margin. Sheath — Hairy veined, usually closed lower $\frac{2}{3}$. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Round, not branched. Outstanding Characters — Sheath closed lower $\frac{2}{3}$. Ligule truncate-entire, $\frac{1}{2}$ -1 mm. Conspicuous soft hairs over plant. Midrib prominent dorsally and ventrally.



27. *Bromus inermis* Leyss. SMOOTH BROME

Large erect bunchgrass. Vernation — Curled. Blades — Flat, wide, drooping, usually a W on blade; rough ventrally and dorsally; veins each side of midrib, 5-6; rib prominent ventrally and dorsally; midrib prominent dorsally; 4-5 mm wide, 10-20 cm long. Auricle — None. Ligule — Membranous, small $\frac{1}{2}$ mm. Collar — Glabrous, divided. Sheath — Closed, sometimes hairy, veined, round, papery margin. Nodes — Occasionally pubescent. Internodes — Glabrous, veined. Roots — Short rhizomes. Culm — Round, not branched, large. Outstanding Characters — Sheath closed. The letter W or M on blades. Blades large, flat, long ribbed.



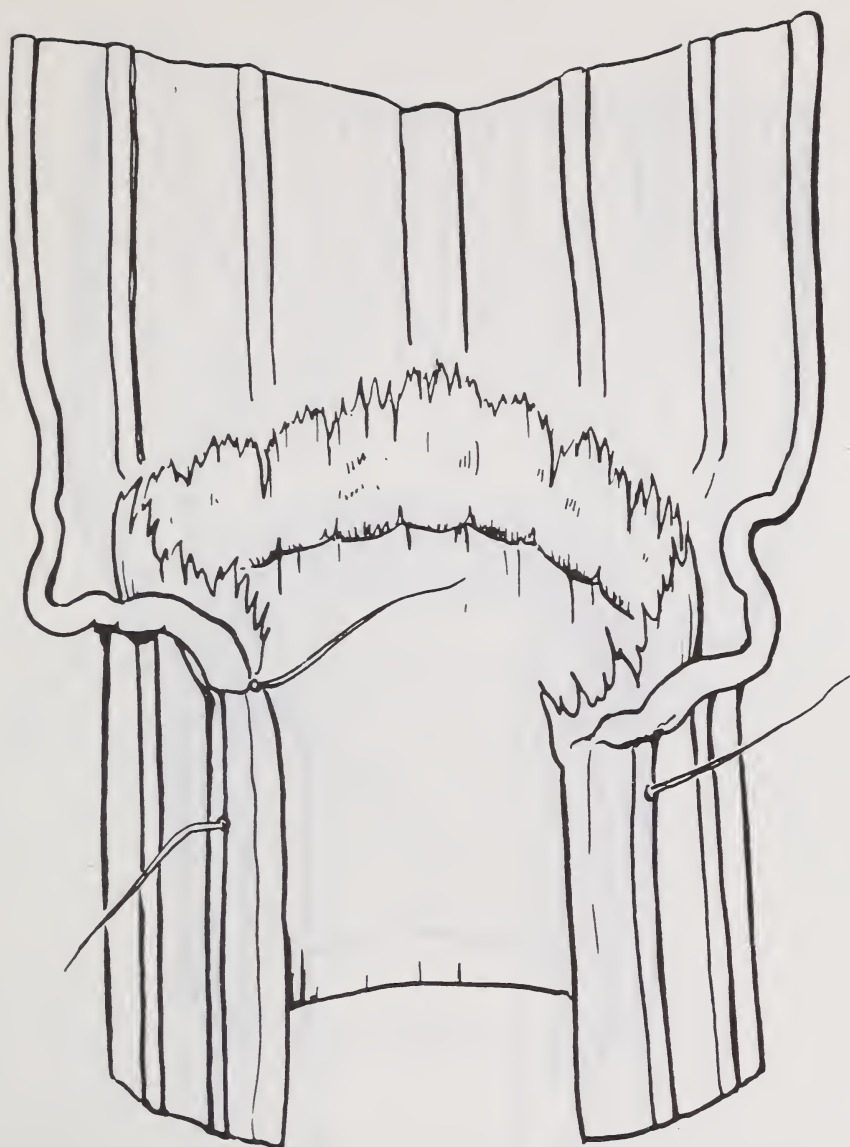
28. *Bromus rubens* L. RED BROME

Erect to semi-decumbent, annual. Vernation — Curled. Blades — Flat, pointed; hairy dorsally and ventrally; veins each side midrib, 2-3; ribs prominent ventrally and dorsally; blade margin smooth; midrib prominent, 1-2 mm wide, 2-6 cm. long. Auricle — None. Ligule — Membranous, $\frac{1}{2}$ -3 mm long, acute-lacerate. Collar — Smooth. Sheath — Pubescent, papery margin, round, usually closed. Nodes — Glabrous. Internodes — Occasionally puberulent near nodes. Roots — Fibrous, weak. Culm — Not branched, round. Outstanding Characters — Winter annual. Blades short, narrow, flat. Midrib prominent ventrally. Ligule acute-lacerate. Awns $\frac{1}{2}$ -1 cm. Head at maturity reddish color.



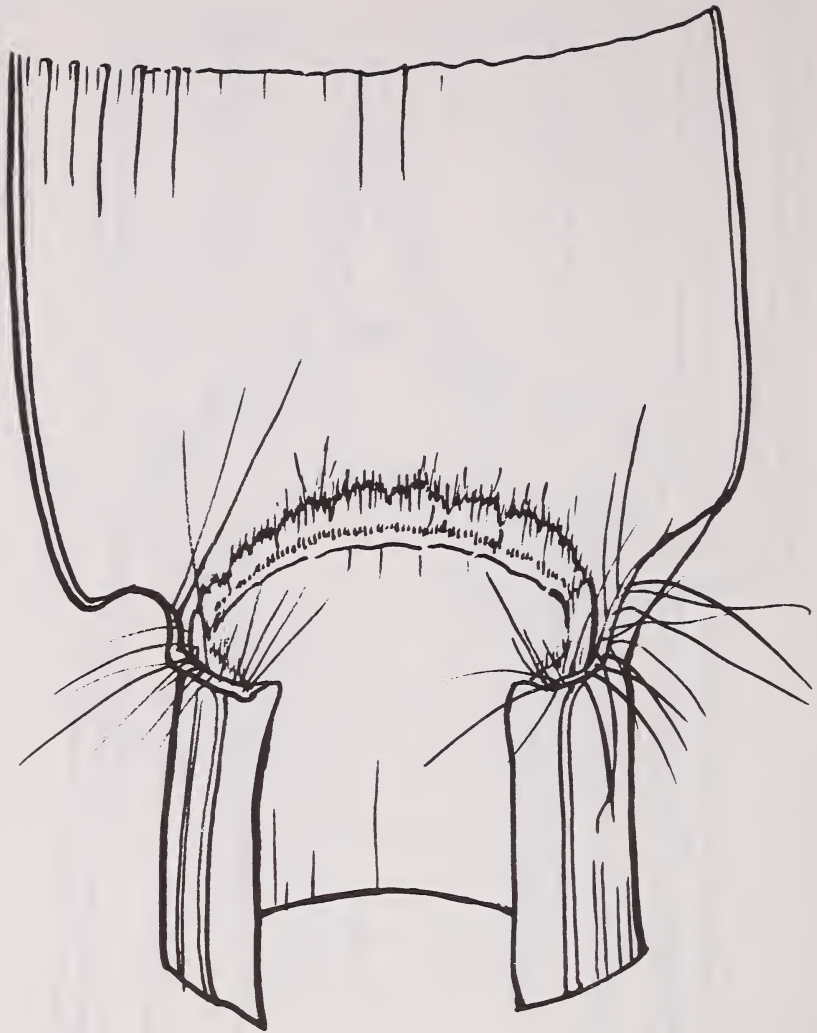
29. *Bromus tectorum* L. DOWNY CHESS, CHEATGRASS BROME

Semi-erect, small bunchgrass, annual. Heads open, drooping. Vernation — Curled. Blades — Flat twisted, drooping, blunt pointed; hairy ventrally and dorsally, soft; veins each side of midrib, 2-3; ribs indistinct; margin hairy; midrib prominent ventrally; 2-4 mm wide, 5-10 cm long. Auricle — None. Ligule — Membranous, collar-like, small 1-2 mm, obtuse-lacerate, paper-like. Collar — Smooth, divided. Sheath — Woolly, round, closed. Nodes — Glabrous, dark in color. Internodes — Glabrous. Roots — Shallow, fibrous. Culm — Round, not branched. Outstanding Characters — Awn, 1-2 cm. Winter annual. Fire hazard. Sheath growth together. Ligule very thin, obtuse-lacerate. Woolly over most of plant, soft to touch. In northern climates grows in spring and fall. Excellent for lambing.



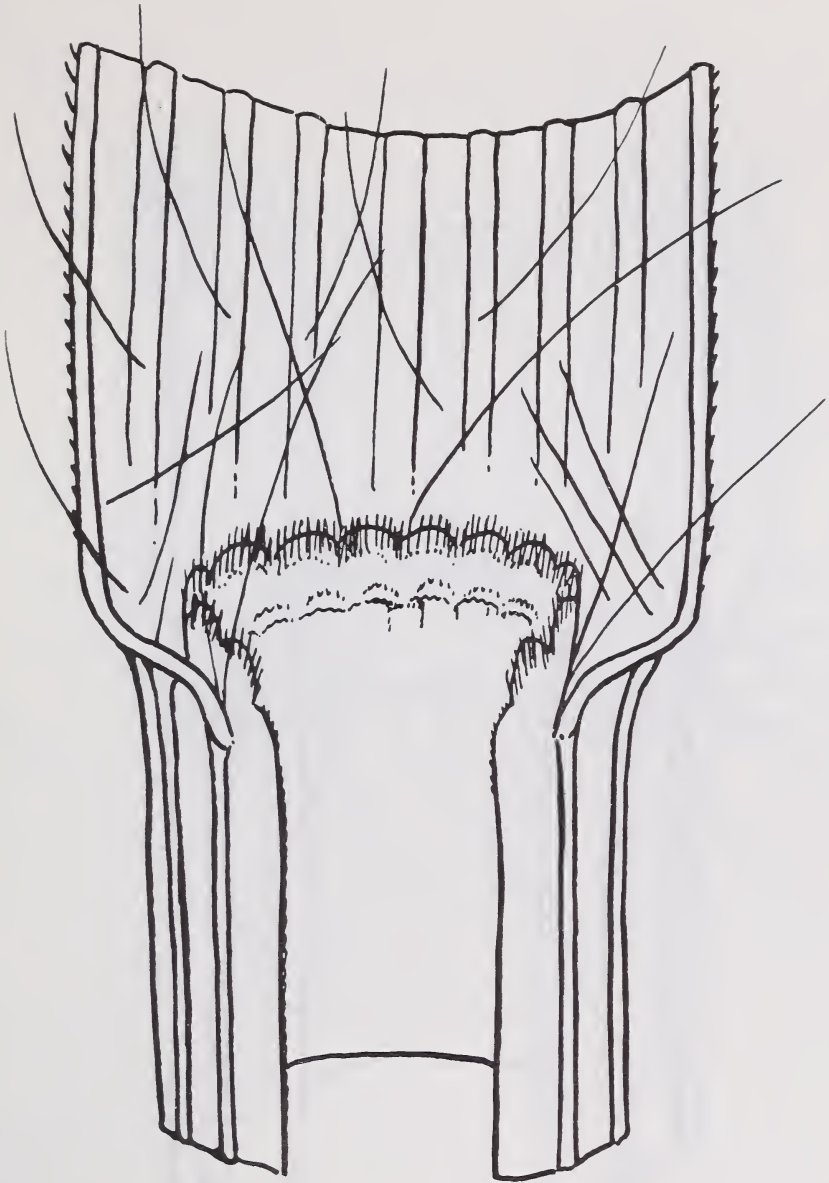
30. *Chloris virgata* Swartz. FEATHER FINGERGRASS

Semi-erect, annual small bunchgrass. Vernation — Curled. Blades — Flat, wide, long; occasionally glandular hairs dorsally near base, 2-3 mm ; veins each side of midrib, 3; ribs numerous, not prominent; margin often straw colored; midrib prominent ventrally; 3-6 mm wide, 8-15 cm long. Auricle — None. Ligule — Membranous, small, 1 mm , truncate-ciliate. Collar — Glabrous. Sheath — Glabrous, hyaline margin. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous, annual. Culm — Elliptical, branched at base. Outstanding Characters — Annual. Blades flat, wide, occasionally glandular hairs dorsally. Ligule 1 mm ; truncate-ciliate. Blade midrib prominent ventrally.



31. *Cynodon dactylon* (L) Pers. BERMUDAGRASS

Decumbent, sodgrass. Vernation — Curled. Blades — Flat, wide, short, usually glabrous; veins each side of midrib, 2; ribs not prominent; margin white, midrib prominent dorsally; 1-4 mm. wide, 2-6 cm long. Auricle — None. Ligule — Hairy, medium, 1 mm, with scattered long hairs. Collar — Usually glabrous, occasionally with long hairs. Sheath — Usually glabrous, hyaline margin, often with tufts of hair at the summit. Nodes — Glabrous. Internodes — Glabrous. Roots — Rhizomatous. Culm — Elliptical, branched, stoloniferous. Outstanding Characters — Culms, stoloniferous, branched. Ligule hairy. Blade flat, short, wide. Growth decumbent except flower stalks.



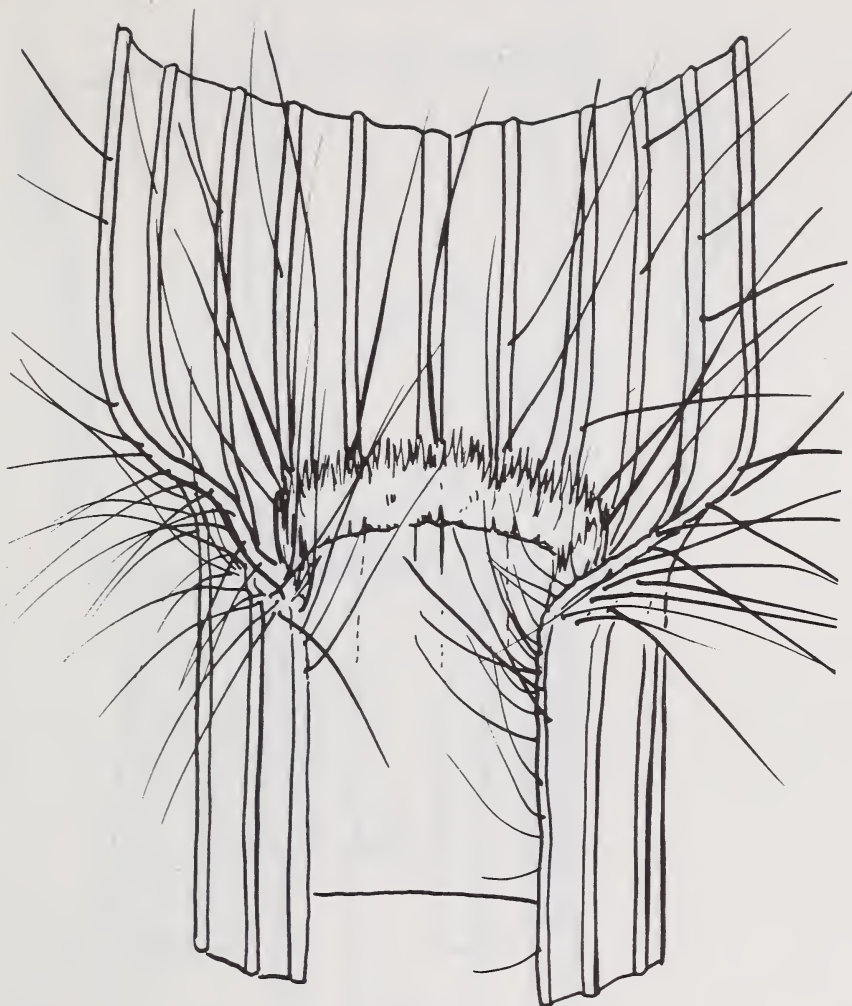
32. *Distichlis stricta* (Torr.) Rydb. DESERT SALTGRASS

Erect, semi-sodgrass. Vernation — Clasped. Blades — Flat to rolled, erect, narrow, pointed; hairy ventrally, frequently with salt deposits; veins each side of midrib, 3; ribs prominent dorsally; margin toothed; midrib prominent ventrally; 2-3 mm wide at base, 1-6 cm long. Auricle — None. Ligule — Hairy, small $\frac{1}{2}$ -1 mm. Collar — occasionally hairy margin 1-2 mm. Sheath — Smooth, round, paper margin. Nodes — Glabrous. Internodes — Glabrous. Roots — Rhizomatous. Culm — Round, not branched. Outstanding Characters — Rhizomatous. Blades usually rolled at tip, short. Lower culms and rhizomes conspicuously shiny.



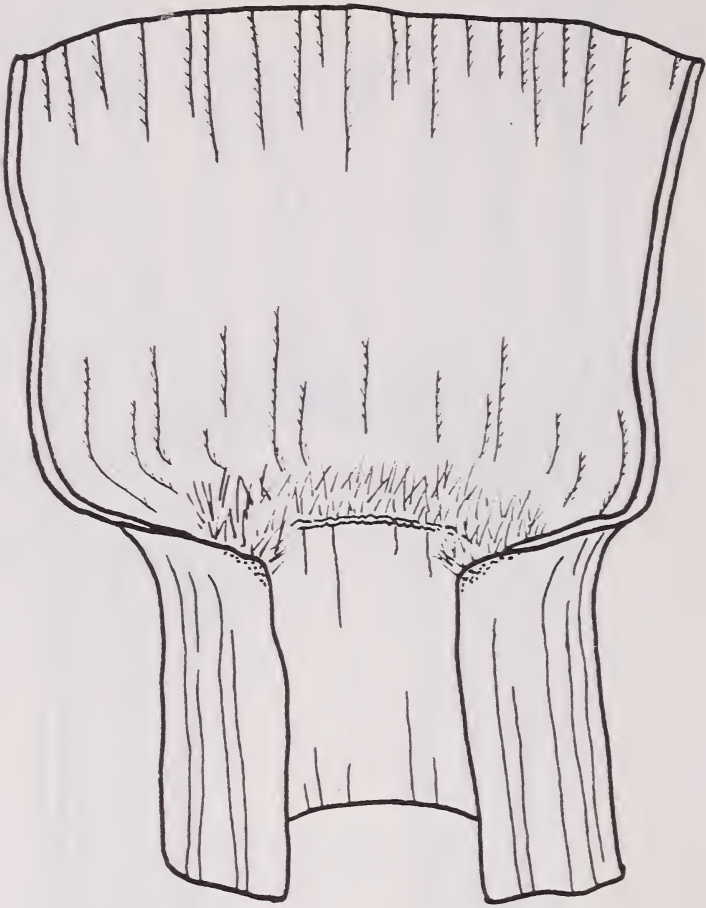
33. *Elyonurus barbiculmis* Hack. WOOLSPIKE

Erect, medium bunchgrass. Vernation — Folded. Blades — Rolled, narrow, long, hairy, ventrally, pilose, 3-5 mm ; ribs prominent dorsally; midrib not prominent; 1 mm. wide, 15-30 cm long. Auricle — None. Ligule — Hairy, small 1 mm , front pilose, 1-5 mm. Collar — Glabrous, divided. Sheath — Glabrous, veined. Nodes — Glabrous. Internodes — Pubescent to villous below node. Roots — Fibrous. Culm — Round, branched. Outstanding Characters — Ligule hairy, front pilose, 2-5 mm. Stems pubescent below node. Blades narrow, long rolled, hairy ventrally. Culms branched; heads silvery, densely pilose.



34. *Eragrostis intermedia* Hitchc. PLAINS LOVEGRASS

Erect, medium bunchgrass. Vernation — Curled. Blades — Flat, long, narrow, scattered hairs; veins each side of midrib, 3-4; ribs prominent ventrally and dorsally; margin smooth; midrib prominent dorsally; 2 mm wide, 10-30 cm long. Auricle — None. Ligule — Membranous, small $\frac{1}{2}$ mm., truncate-ciliate, with long conspicuous hairs, 3-5 mm. Collar — Hairy on margin. Sheath — Glabrous, veined. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Elliptical, not branched. Outstanding Characters — Blades flat, long narrow. Conspicuous ribs on blade and sheath. Ligule membranous with long hairs. Collar bearded. Culm elliptical.



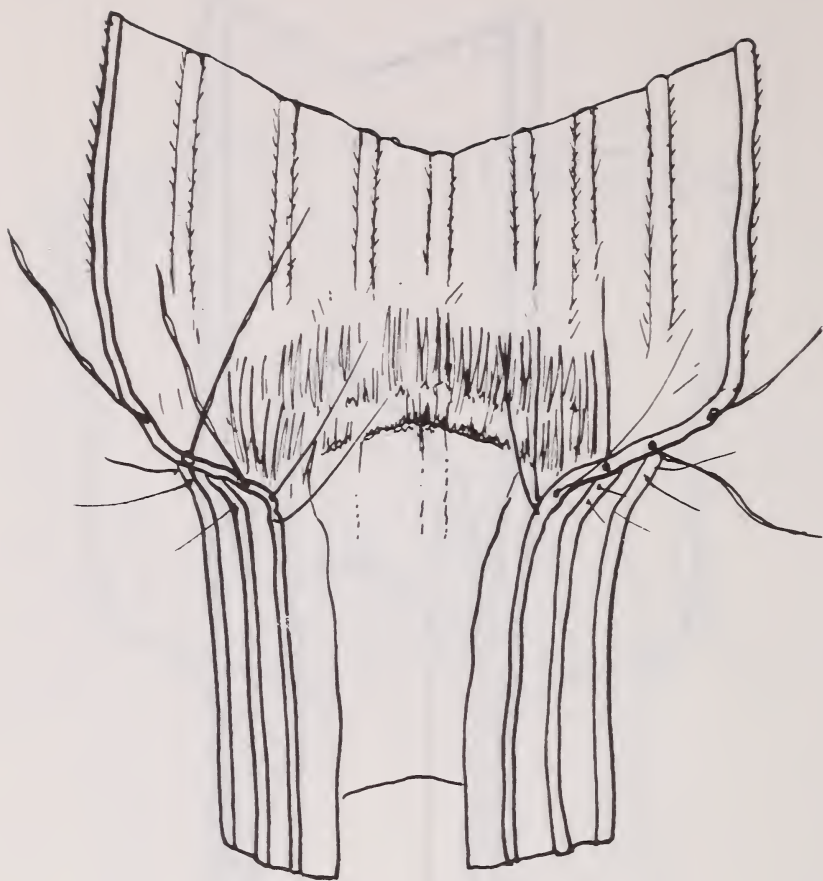
35. *Eragrostis lehmanniana* Nees. LEHMANN LOVEGRASS

Erect, large bunchgrass. Vernation — Curled. Blades — Flat, drooping, wide, long, pointed; glabrous, soft; veins each side of midrib, 3; ribs prominent ventrally and dorsally; margin glabrous; midrib not prominent, 3-4 mm wide, 12-15 cm long. Auricle — None. Ligule — Hairy or membranous, truncate-ciliate, $\frac{1}{2}$ -1 mm. Collar — Hairy margin, 2-3 mm. Sheath — Round, veined, frequently bearded at base. Nodes — Occasionally pubescent. Internodes — Glabrous. Roots — Fibrous. Culm — Round, occasionally branched. Outstanding Characters — Blades flat, long. Blade ribs prominent. Collar margin hairy, 1-3 mm. Ligule truncate-ciliate, $\frac{1}{2}$ -1 mm. Large leafy bunch. Culm round.



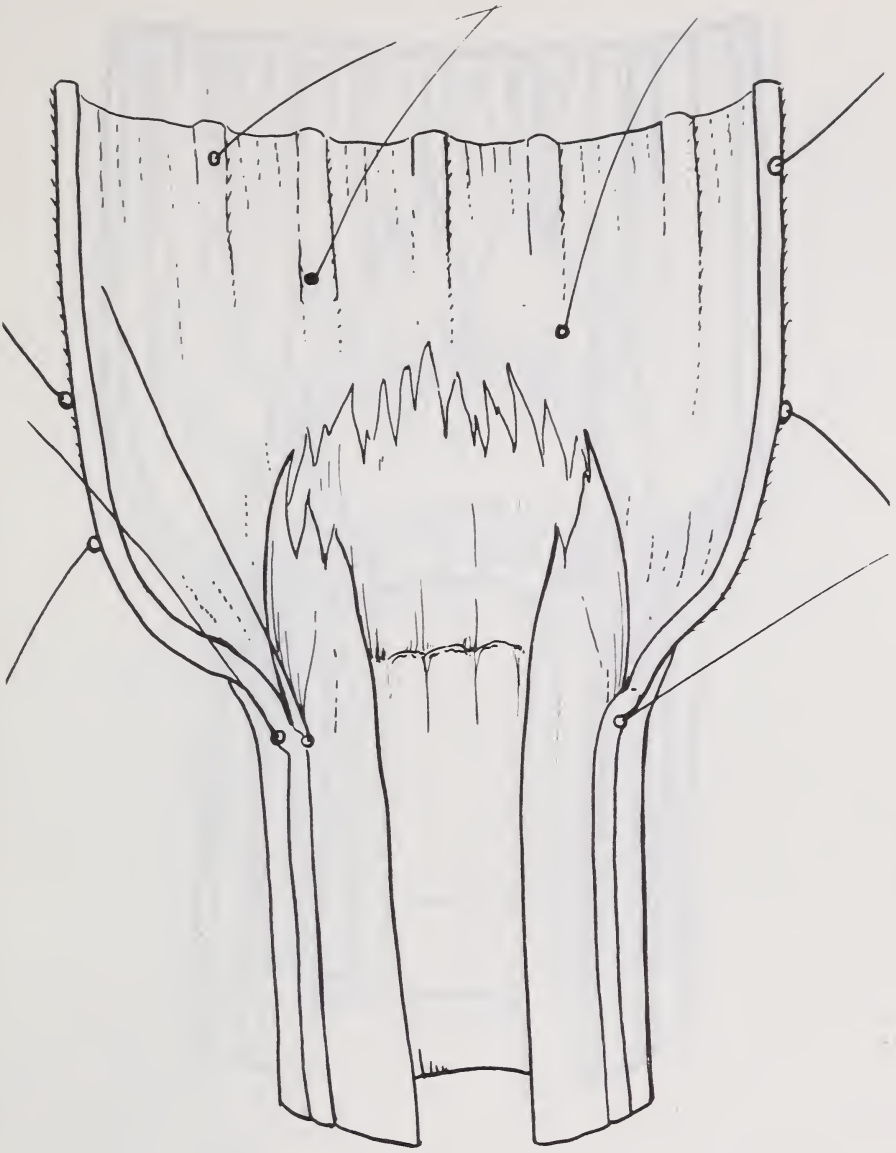
36. *Festuca arizonica* Vasey. ARIZONA FESCUE

Erect, large bunchgrass. Vernation — Folded. Blades — Rolled, drooping, very small; glabrous; ribs indistinct; margin toothed; midrib indistinct; $\frac{1}{4}$ - $\frac{1}{2}$ mm wide, 10-30 cm long. Auricle — None. Ligule — Membranous; very small, $\frac{1}{4}$ - $\frac{1}{2}$ mm; acute-entire. Collar — Indistinct. Sheath — Elliptical, pinkish above roots. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Round, not branched. Outstanding Characters — Long drooping, rolled, thread-like blades. Large bunches. Ligule very small and difficult to observe.



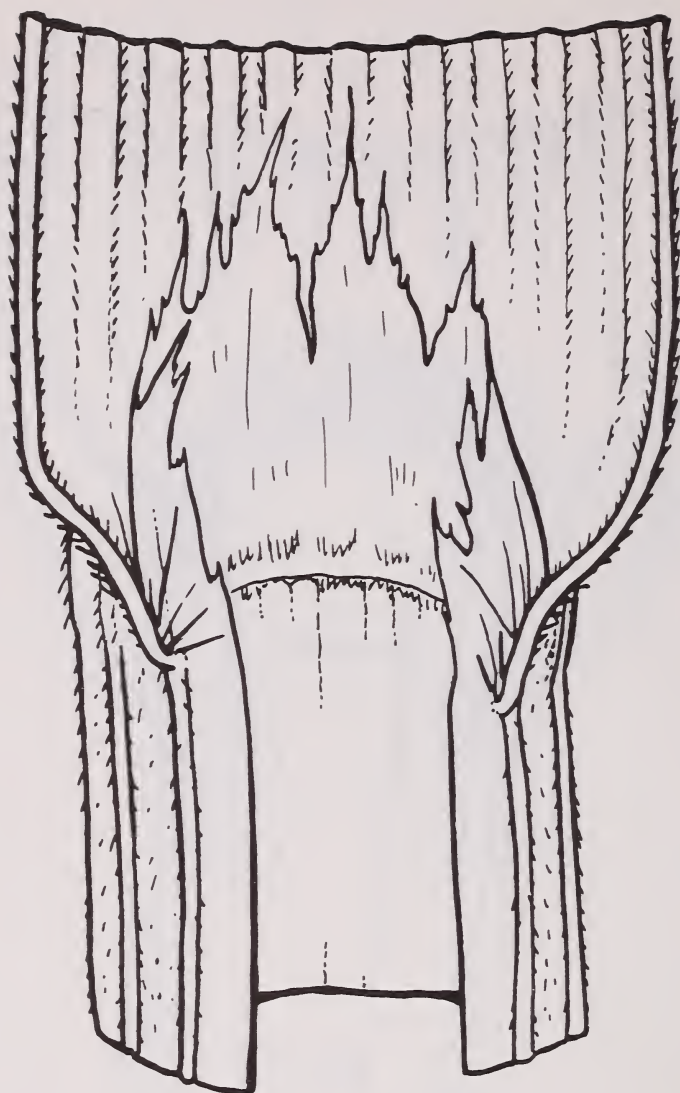
37. *Heteropogon contortus* (L.) Beauv. TANGLEHEAD

Erect, small bunchgrass. Vernation — Folded. Blades — Flat, wide; hairy occasionally ventrally; veins each side of midrib, 3-4; ribs not prominent; margin glandular at base, white; midrib prominent ventrally; 6-8 mm wide, 6-15 cm long. Auricle — None. Ligule — Hairy, lower $\frac{1}{2}$ membranous, overall length 1 mm. Collar — Hairy margin, glandular, 2-4 mm. Sheath — Flat, glabrous, veined. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Flat, not branched. Outstanding Characters — Blades flat, wide, occasionally folded at base. Culm flat. Blade margin and collar with glandular hairs. Ligule hairy, small. Midrib prominent ventrally. Awns long, hairy, tangled mass.



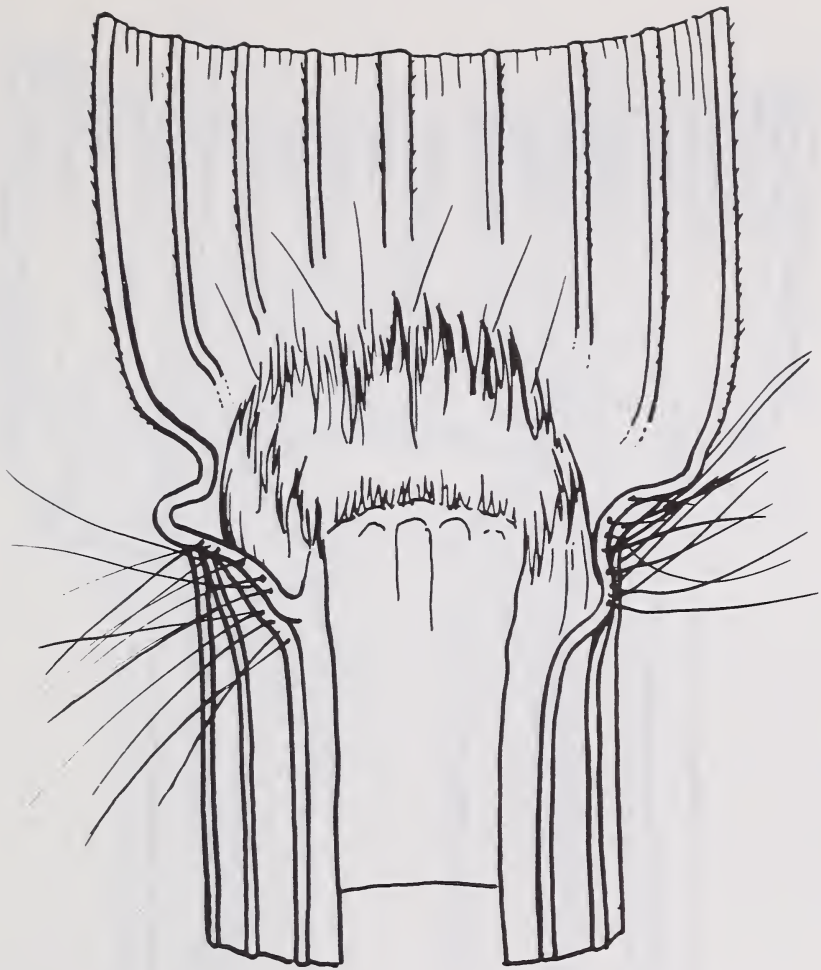
38. *Hilaria belangeri* (Steud.) Nash. CURLYMESQUITE

Open sodgrass. Vernation — Curled. Blades — Flat, curled, narrow, pointed, long; hairy, glandular; veins on each side of midrib, 2; ribs not prominent ventrally; 2 mm wide, 5-20 cm long. Auricle — None. Ligule — Membranous, large 2 mm; truncate-lacerate. Collar — Glabrous. Sheath — Glabrous, paper margin. Nodes — Hairy. Internodes — Glabrous. Roots — Fibrous. Culm — Round, lower nodes grow roots and culms. Outstanding Characters — Culms root at lower nodes. Nodes hairy. Blades with glandular hairs, 2-4 mm. Ligule 2 mm truncate-lacerate.



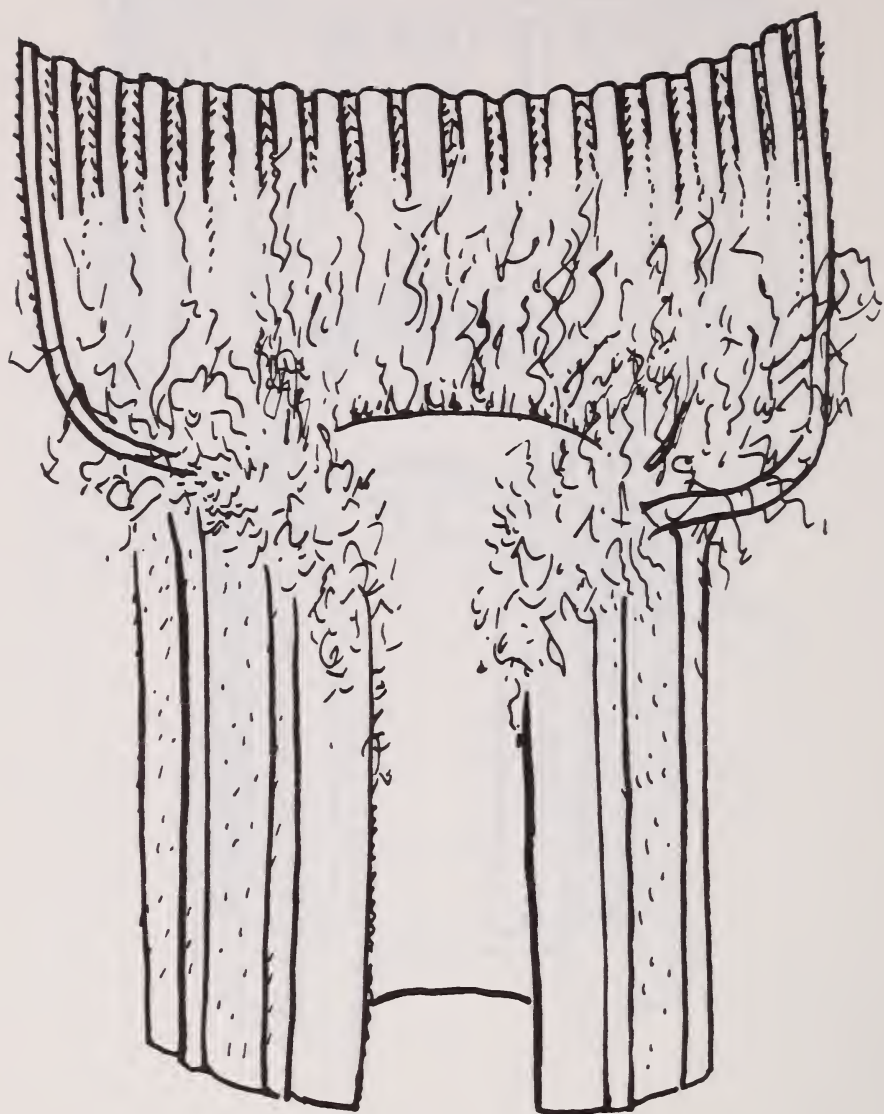
39. *Hilaria jamesii* (Torr.) Benth. GALLETA

Erect, large bunchgrass. Vernation — Curled. Blades — Flat base, upper $\frac{2}{3}$ often rolled, pointed; rough ventral and dorsal; veins each side of midrib, 3-4; ribs prominent dorsally; margin toothed; midrib not prominent; 3-5 mm wide at base, 4-12 cm long. Auricle — None. Ligule — Membranous, 1-3 mm., truncate-lacerate. Collar — Usually glabrous. Sheath — Elliptical, veined. Nodes — Pubescent to villous. Internodes — Often pubescent below node. Roots — Rhizomatous. Culm — Round, not branched. Outstanding Characters — Blades flat base, upper rolled. Rhizomatous. Nodes pubescent. Ligule 1-3 mm, truncate-lacerate. Culm base frequently semi-decumbent. Rachis zigzag.



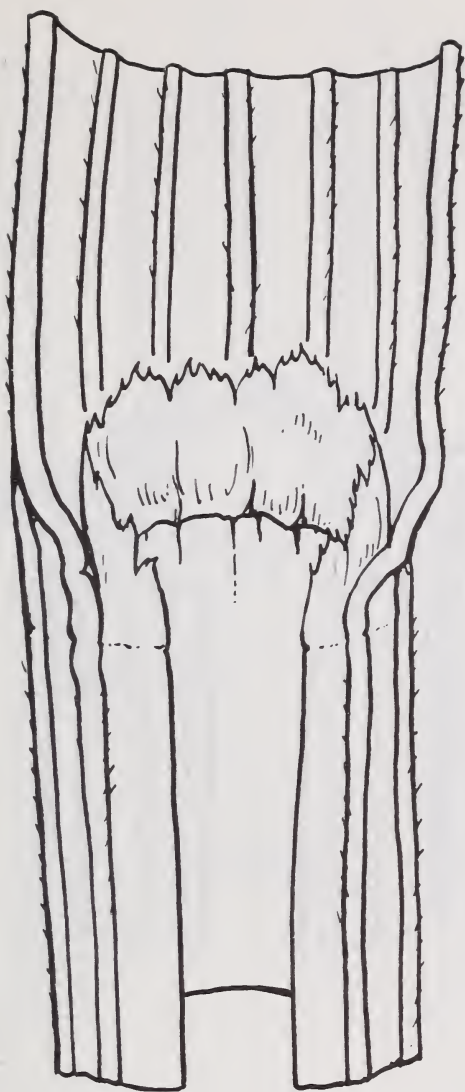
40. *Hilaria mutica* (Buckl.) Benth. TOBOSA

Big bunchgrass, semi-erect. Vernation — Curled. Blades — Flat to rolled; occasionally hairy ventrally; veins each side of midrib, 2-3; ribs prominent; midrib prominent ventrally; 2-4 mm wide, 5-10 cm long. Auricle — None. Ligule — Membranous, truncate-ciliate, 1-2 mm. Collar — Hairy margin. Sheath — Glabrous, veined. Nodes — Glabrous to pubescent. Internodes — Glabrous. Roots — Rhizomatous. Culm — Round, Branched. Outstanding Characters — Blade usually rolled. Growth semi-decumbent, large bunchgrass. Rhizomatous. Culms branch. Ligule truncate-ciliate.



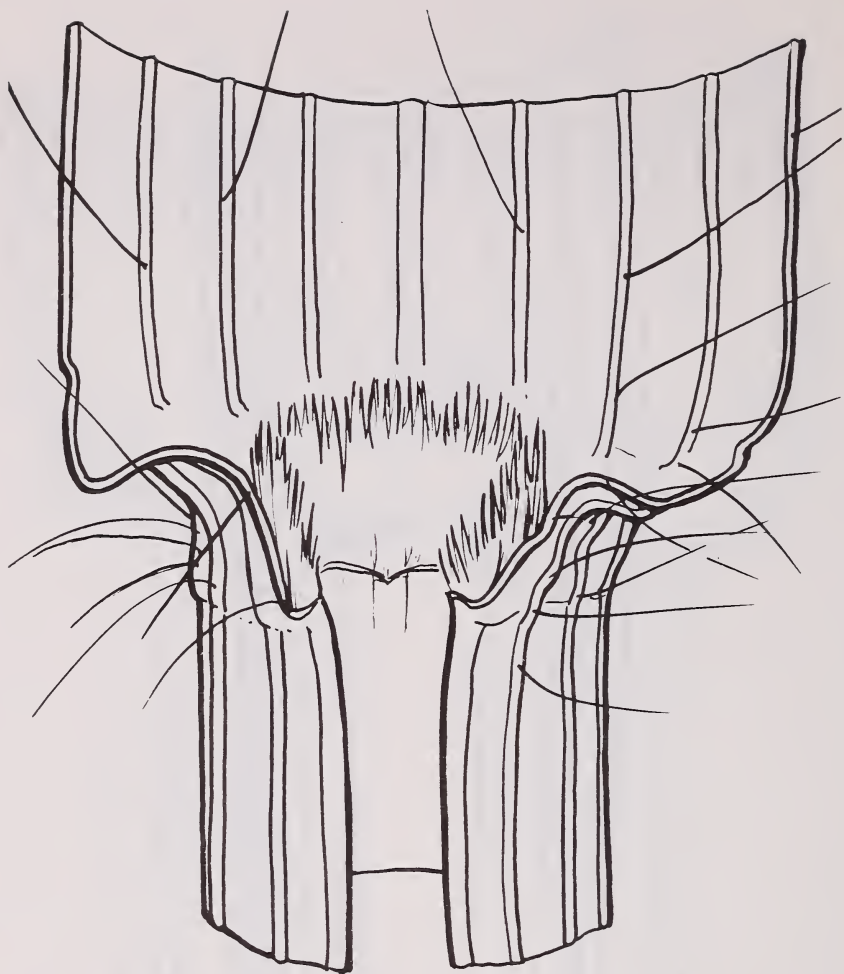
41. *Hilaria rigida* (Thurb.) Benth. ex Scribn. BIG GALLETA

Erect, large bunchgrass. Vernation — Curled. Blades — Flat at base, upper part rolled, erect, narrow, pointed; smooth, stiff; veins each side midrib 2-4; ribs prominent ventrally, 6-8; margin toothed; midrib prominent dorsally; width 1-2 mm; length 4-10 cm. Auricle — None. Ligule — Hairy to woolly, small, 1 mm. Collar — Woolly. Sheath — Round, margin woolly. Roots — Hard, scaly, rhizomatous. Culm — Round, branched. Outstanding Characters — New growth sprouts at nodes. Ligule, nodes, collar, sheath and culms woolly.



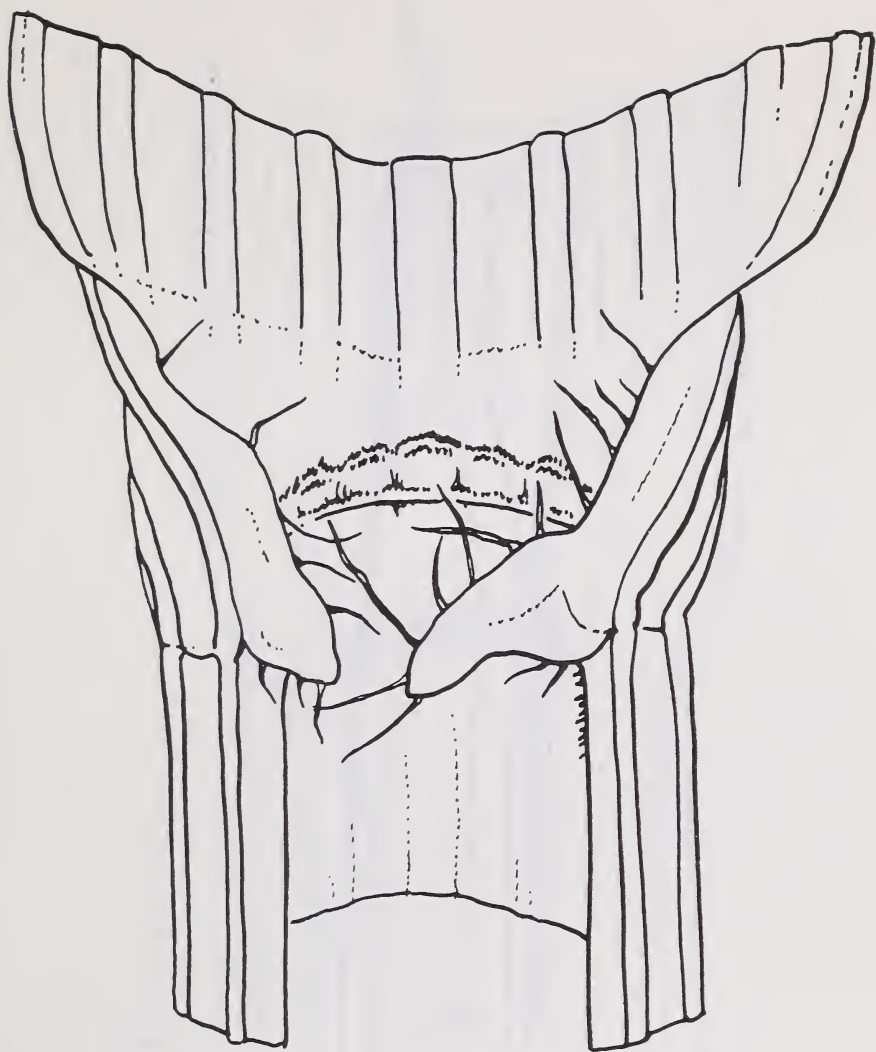
42. *Koeleria cristata* (L.) Pers. JUNEGRASS

Erect, small bunchgrass. Vernation — Folded. Blades — Flat, drooping, narrow, pointed; rough ventrally, canescent dorsally, soft; veins each side of midrib usually 2; ribs prominent ventrally; margin toothed; width 2 mm, length 5-15 cm. Auricle — None. Ligule — Membranous, small $\frac{1}{4}$ - $\frac{1}{2}$ mm truncate-ciliate. Collar — Glabrous to canescent. Sheath — Usually canescent, round. Nodes — Usually glabrous. Internodes — Usually canescent above node. Roots — Fibrous. Culm — Round, not branched. Outstanding Characters — Blade flat, conspicuously ribbed ventrally, soft. Internode canescent near node. Ligule membranous, truncate-ciliate $\frac{1}{2}$ mm.



43. *Leptochloa dubia* (H.B.K.) Nees. GREEN SPRANGLETOP

Erect, medium bunchgrass. Vernation — Folded (reported in Colorado as curled). Blades — Flat, wide, long, drooping; occasional hairs dorsally 2-5 mm , on lower $\frac{1}{3}$; veins on each side of midrib 2-3; ribs ventral and dorsal; margin toothed; midrib prominent ventrally; width 4-5 mm , length 15-25 cm. Auricle — None. Ligule — Hairy, small $\frac{1}{2}$ mm , margin hairs 3-5 mm. Collar — Hairy margin, 3-5 mm. Sheath — Glabrous, veined, papery margin. Node — Glabrous. Internode — Glabrous. Roots — Fibrous. Culm — Flat, not branched. Outstanding Characters — Collar margin hairy. Culms flat. Ligule hairy, small $\frac{1}{2}$ mm occasional hairs 3-5 mm. Blades flat, wide, long drooping. Sheath veined, papery margin.



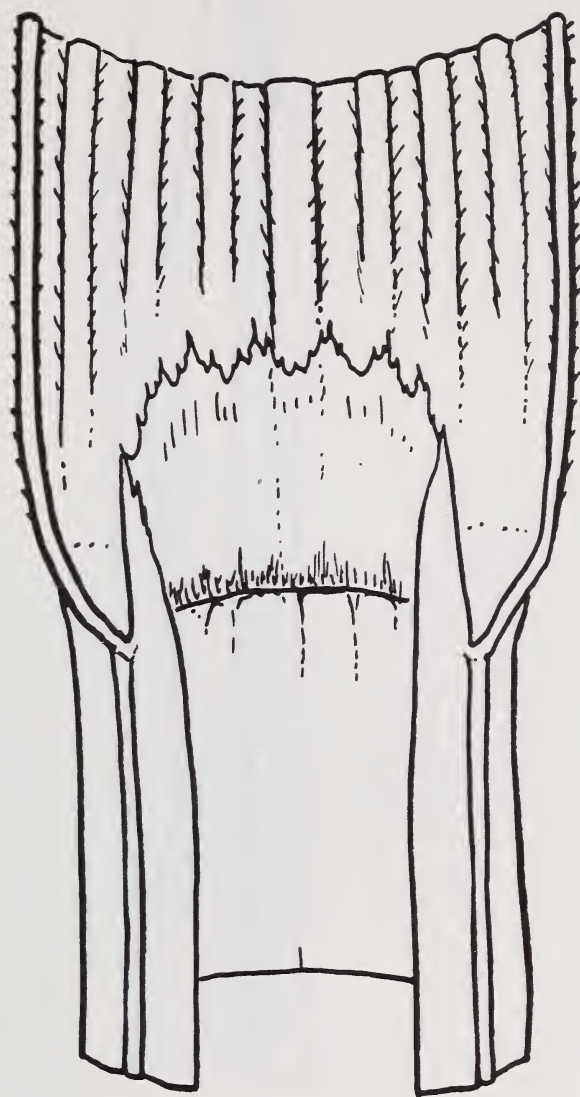
44. *Lolium perenne* L. PERENNIAL RYEGRASS

Erect to semi-erect, small bunchgrass. Vernation — Folded. Blades — Flat to folded, wide, long drooping; glabrous; glossy dorsally; veins each side of midrib 2-3; ribs prominent ventrally; margin glabrous; midrib prominent dorsally; width 3-4 mm, length 8-15 cm. Auricle — Small, 1 mm. Ligule — Membranous, medium 1-2 mm acute-toothed. Collar — Glabrous, divided. Sheath — Usually closed, strongly ribbed, glabrous. Node — Glabrous. Internode — Glabrous. Roots — Fibrous. Culm — Elliptical. Outstanding Characters — Blades glossy ventrally. Auricle present clawed or reduced. Sheath usually closed and pinkish at base.



45. *Lycurus phleoides* H.B.K. WOLFTAIL

Erect, small bunchgrass. Vernation — Folded. Blades — Usually folded, drooping, glabrous; veins each side of midrib 2; margin white, toothed; ribs indistinct; midrib prominent dorsally; width 1 mm, length 3-10 cm. Auricle — None. Ligule — Membranous, large, 2-5 mm acute-entire. Collar — Glabrous. Sheath — Flat, hyaline white margin. Node — Short canescent. Internode — Glabrous to short canescent near nodes. Roots — Fibrous. Culm — Flat, branched. Outstanding Characters — Blades and sheath conspicuous white margin, flattened at base. Ligule large acute. Culms branch at nodes. Blade usually folded.



46. *Muhlenbergia curtifolia* Scribn. UTAH MUHLY

Erect, medium sized bunchgrass. Vernation — Clasped. Blade — Rolled, semi-erect, pointed; rough, stiff, pubescent ventrally; veins each side of midrib 3-4; ribs prominent dorsally; margin toothed; midrib prominent ventrally; width 1 mm, length 1-2½ cm. Auricle — None. Ligule — Membranous, small 1-2 mm, acute-lacerate. Collar — Glabrous. Sheath — Glabrous, veined, round. Node — Glabrous. Internode — Pubescent to glabrous. Roots — Fibrous. Culm — Round, not branched. Outstanding Characters — Ligule membranous, 1-2 mm, acute-lacerate. Blades rolled, long and narrow. Blade veins 3-4. Plant glabrous.



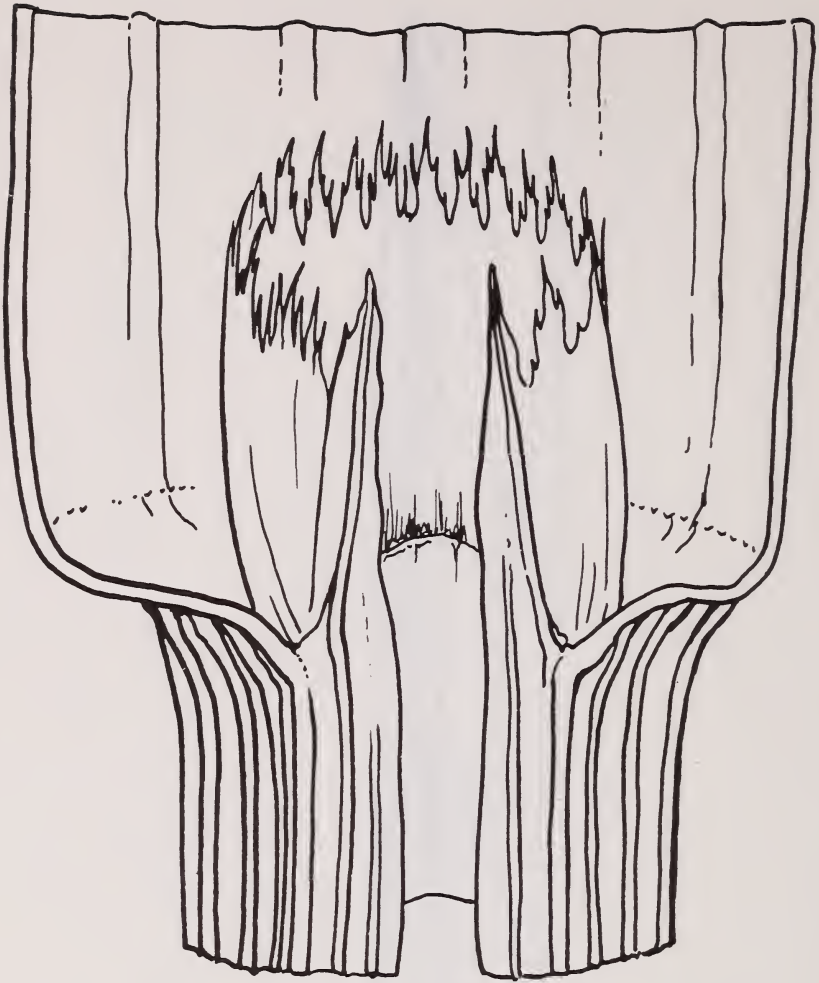
47. *Muhlenbergia emersleyi* Vasey. BULLGRASS

Erect, medium to large bunchgrass. Vernation — Folded. Blades — Usually folded, narrow, long; rough dorsally, stiff; veins each side of midrib 3-4; ribs prominent, numerous; margin toothed, midrib prominent, dorsally; width 2-3 mm , length 15-35 cm. Auricle— None. Ligule — Membranous, 8-15 mm , acute-lacerate. Collar — Glabrous. Sheath — Glabrous, veined. Node — Glabrous. Roots — Fibrous. Culm — Elliptical, not branched. Outstanding Characters — Ligule hyaline, 8-15 mm acute-lacerate. Blade folded, long, narrow.



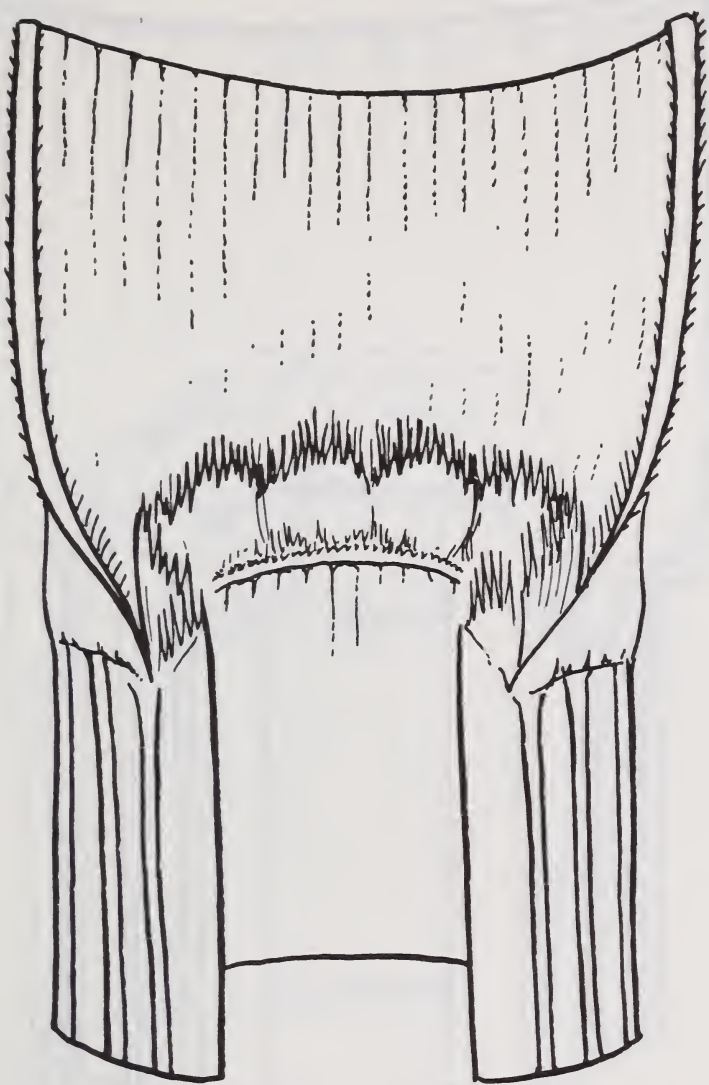
48. *Muhlenbergia montana* (Nutt.) Hitchc. MOUNTAIN MUHLY

Erect to semi-erect, small bunchgrass. Vernation — Folded (reported in Colorado as clasped). Blades — Rolled, narrow, pointed; glabrous and soft; margin toothed; width $\frac{1}{4}$ - $\frac{1}{2}$ mm, length 5-20 cm. Mature blades may be flat. Auricle — None. Ligule — Membranous, large, 6-12 mm, acute-entire. Collar — Distinct, entire. Sheath — Glabrous, margin light color. Node — Glabrous. Internode — Glabrous. Roots — Fibrous. Culms — Round, not branched. Outstanding Characters — Blade rolled, 5-20 mm, narrow, ligule long, hyaline, often shredded, 5-8 mm.



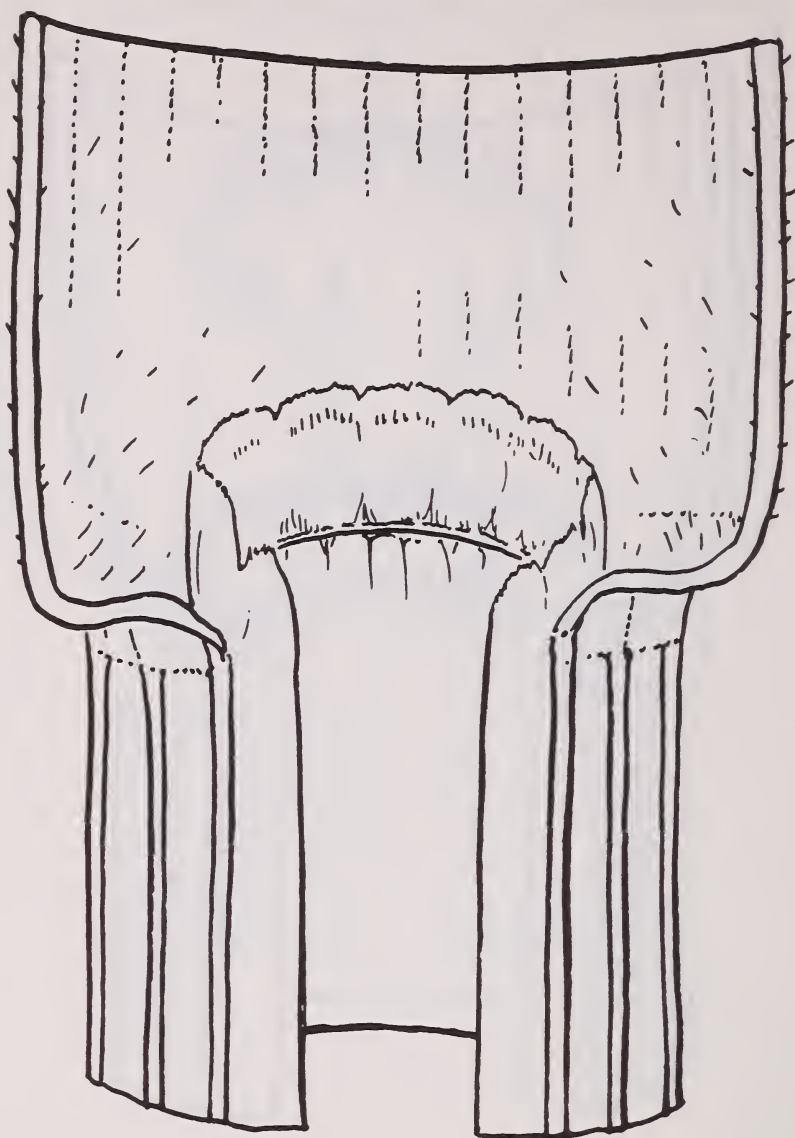
49. *Muhlenbergia porteri* Scribn. BUSH MUHLY

Decumbent, large bunchgrass. Vernation — Curled. Blades — Flat, narrow, short, pointed; rough dorsally; veins each side of midrib 2; ribs not prominent; margin toothed, midrib not prominent; width 1 mm, length 3-8 cm. Auricle — None. Ligule — Membranous, 1-2 mm, hyaline, truncate-lacerate. Collar — Glabrous. Sheath — Open, glabrous, veined. Node — Glabrous. Internode — Glabrous. Roots — Fibrous. Culm — Elliptical to round, branched. Outstanding Characters — Ligule conspicuous, truncate-lacerate, 1-2 mm. Blade short, flat. Branches at nodes. Usually found clambering over shrubs. Culms small, long and semi-woody, persistently green. Florets purple awned.



50. *Muhlenbergia pungens* Thurb. SANDHILL MUHLY

Semi-erect, big bunchgrass. Vernation — Clasped. Blades — Rolled, very sharp pointed (pungent); rough ventrally, stiff; ribs indistinct; width 1 mm, length 3-5 cm. Auricle — None. Ligule — Membranous, small, $\frac{1}{2}$ mm; truncate-ciliate. Collar — Glabrous. Sheath — Open, glabrous, round, papery margined. Node — Canescent. Internode — Canescent. Roots — Rhizomatous. Panicle — Reddish-brown. Culm — Round. Outstanding Characters — Node - internode canescent. Blades rolled pungent. Rhizomatous. Prefers sandy soil. Panicle open, reddish.



51. *Muhlenbergia richardsonis* (Trin.) Rydb. MAT MUHLY

Erect to semi-erect, branched, forming a mat. Vernation — Folded. Blades — Rolled, erect, narrow, pointed; glabrous, rough ventrally, stiff; margin toothed; width $\frac{1}{2}$ mm, length 1-5 cm. Auricle — None. Ligule — Membranous, small $\frac{1}{2}$ -1 mm, truncate-toothed. Collar — Glabrous. Sheath — Glabrous, white hyaline margin, elliptical. Node — Glabrous. Internode — Glabrous. Roots — Fibrous, short rhizomes. Culm — Elliptical, branched. Outstanding Characters — Growth a dense mat. Sheath margin white. Blades short, rolled, erect.



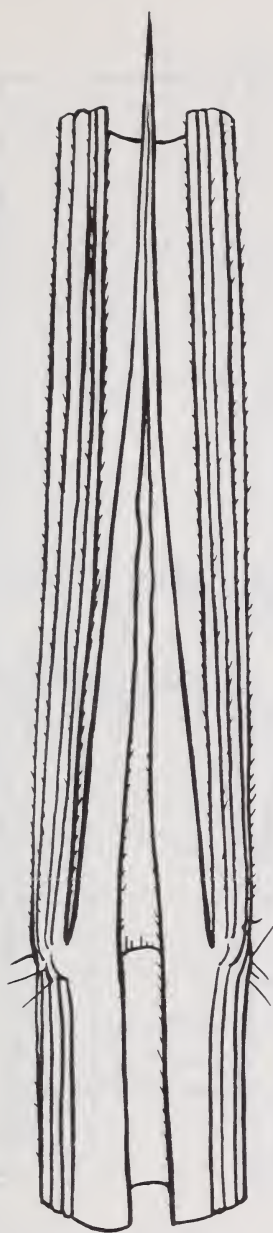
52. *Muhlenbergia rigens* (Benth.) Hitchc. DEERGRASS

Erect, large bunchgrass. Vernation — Clasped. Blades — Flat to rolled, rough, pointed, veins each side of midrib 2; ribs prominent ventrally and dorsally; margin toothed; width 1-2 mm, length 10-20 cm. Auricle — None. Ligule — Membranous, 2-4 mm, obtuse-lacerate. Collar — Glabrous. Sheath — White margin, round, glabrous. Node — Glabrous. Internode — Glabrous. Roots — Fibrous. Culm — Round, not branched. Outstanding Characters — Large bunchgrass. Blades long, narrow, rolled to flat. Ligule membranous, large, acute-lacerate, 2-4 mm.



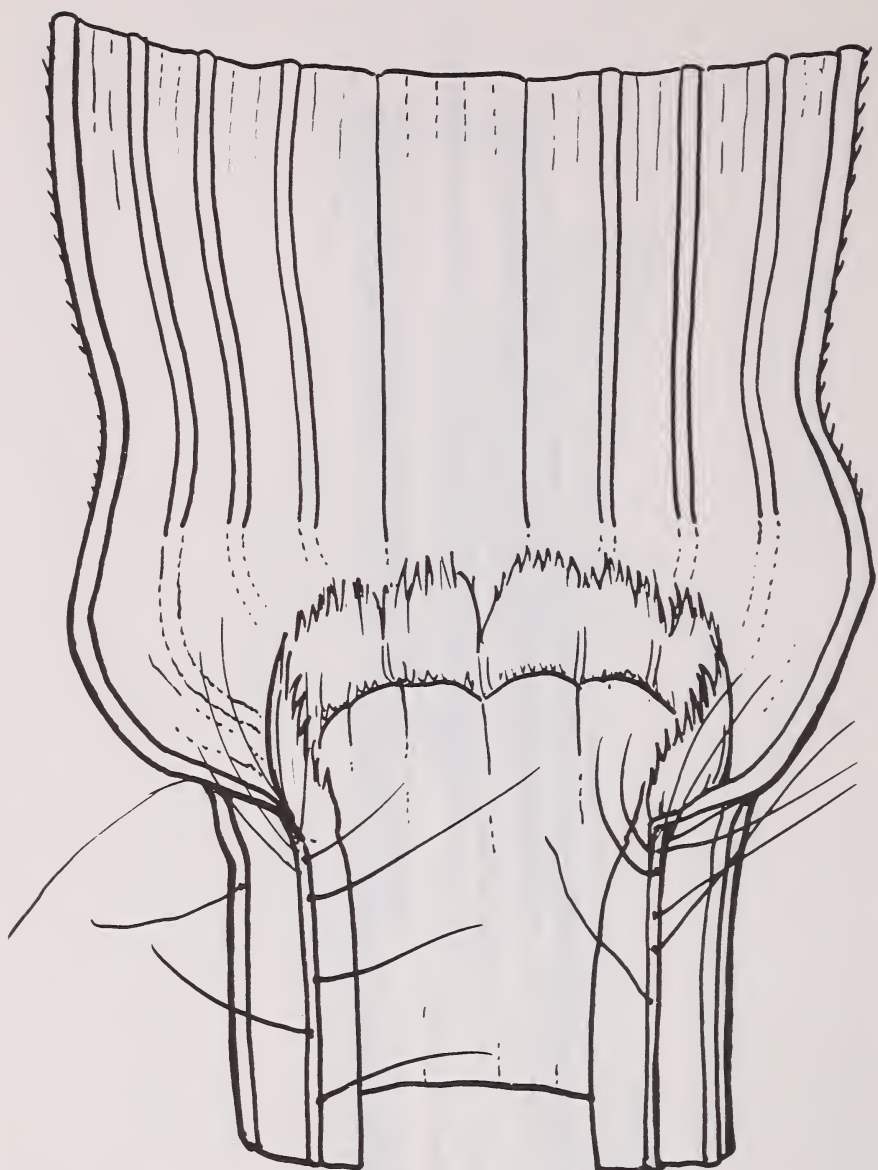
53. *Muhlenbergia torreyi* (Kunth) Hitchc. RING MUHLY

Semi-erect, dense mat, frequently open in center, or ring-like. Vernation — Folded. Blades — Small, folded, erect, narrow, pointed; glabrous; midrib not prominent; width $\frac{1}{2}$ mm, length 1-2 cm. Auricle — None. Ligule — Membranous, medium 2-3 mm, acute-entire. Collar — Glabrous. Sheath — Glabrous, veined, round. Node — Canescent. Internode — Canescent. Roots — Short rhizomes. Culm — Flat, not branched, very small. Outstanding Characters — Growth often ring-like, forming a dense mat. Very small blades and stems, flat. Ligule prominent.



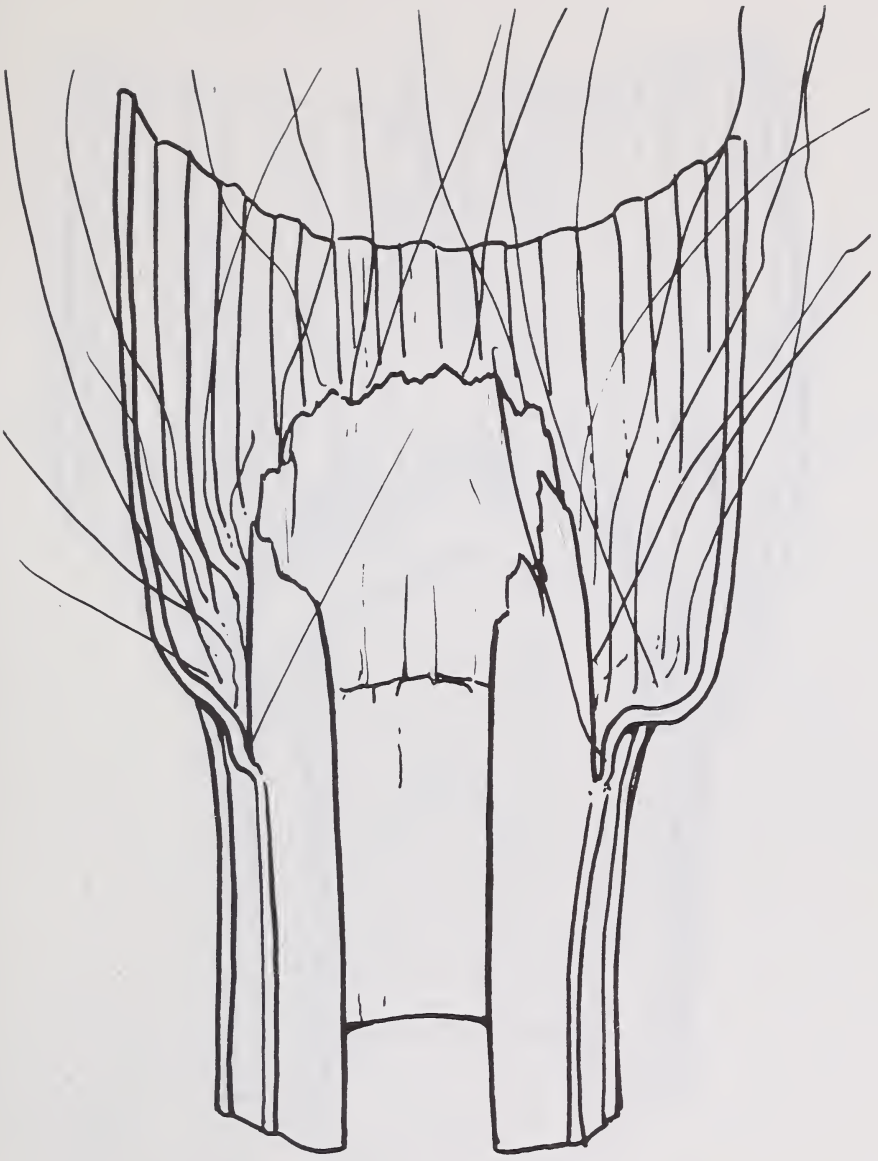
54. *Oryzopsis hymenoides* (Roem. & Schult.) Ricker.
INDIAN RICEGRASS

Erect, small bunchgrass. Vernation — Clasped or curled. Blades — Rolled, drooping, narrow, pointed; rough dorsally; midrib prominent dorsally; width $\frac{1}{2}$ mm, length 5-30 cm. Auricle — None. Ligule — Membranous, hyaline 2-3 mm, acute-entire. Collar — Glabrous to pubescent. Sheath — Hairy margin, 1 mm. Node — Glabrous. Internode — Glabrous to pubescent. Roots — Fibrous. Culm — Round, not branched. Outstanding Characters — Sheath usually hairy margin. Ligule hyaline, acute-entire. Blade rolled, narrow, long.



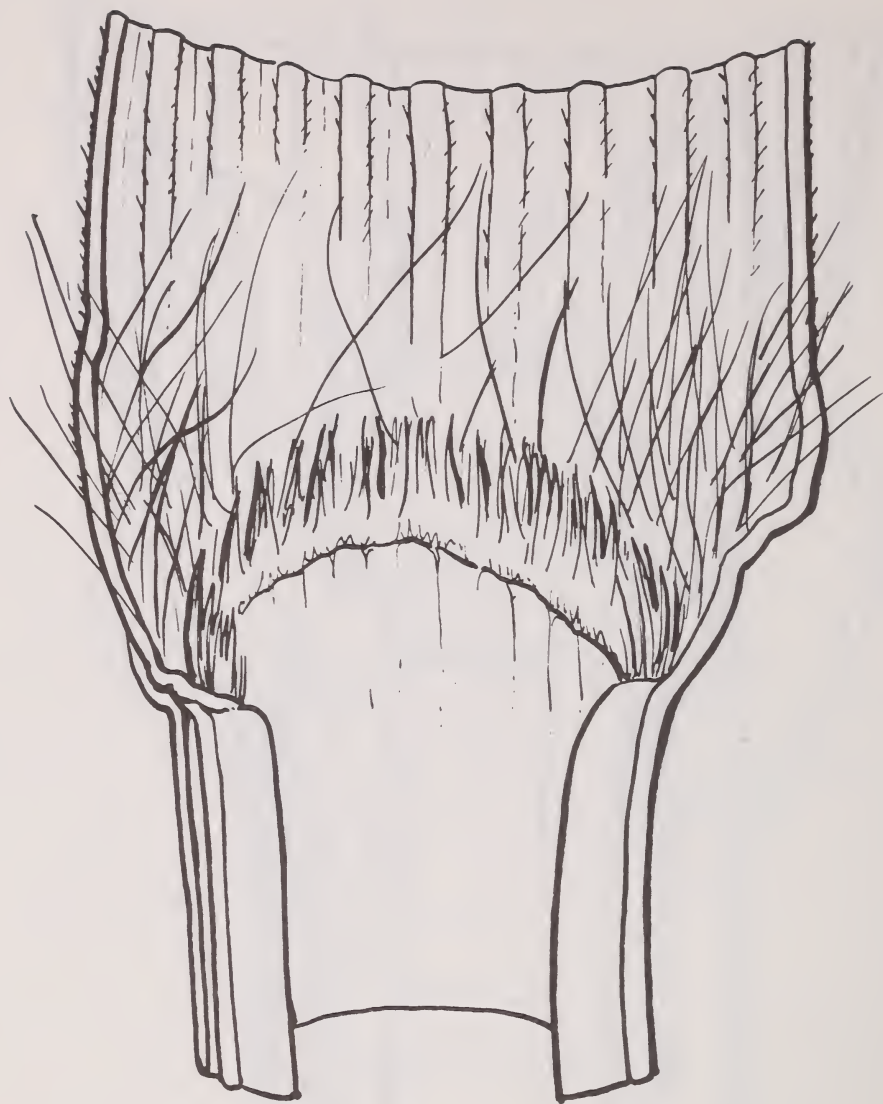
55. *Panicum bulbosum* H.B.K. BULB PANICUM

Erect, small bunchgrass. Vernation — Folded. Blades — Folded to flat, drooping, narrow, pointed; occasional glandular hairs near ligule; veins each side of midrib 3-4; rib prominent ventrally and dorsally, margin white, midrib prominent dorsally, width 2 mm, length 10-20 cm. Auricle — None. Ligule — Membranous, medium 1 mm, truncate-ciliate. Collar — Glabrous, divided. Sheath — Elliptical, occasional glandular hairs near collar. Node — Glabrous. Internode — Glabrous. Roots — Corm, rhizomes. Culm — Flat, not branched. Outstanding Characters — Bulbs prominent. Occasional glandular hairs on blade and sheath.



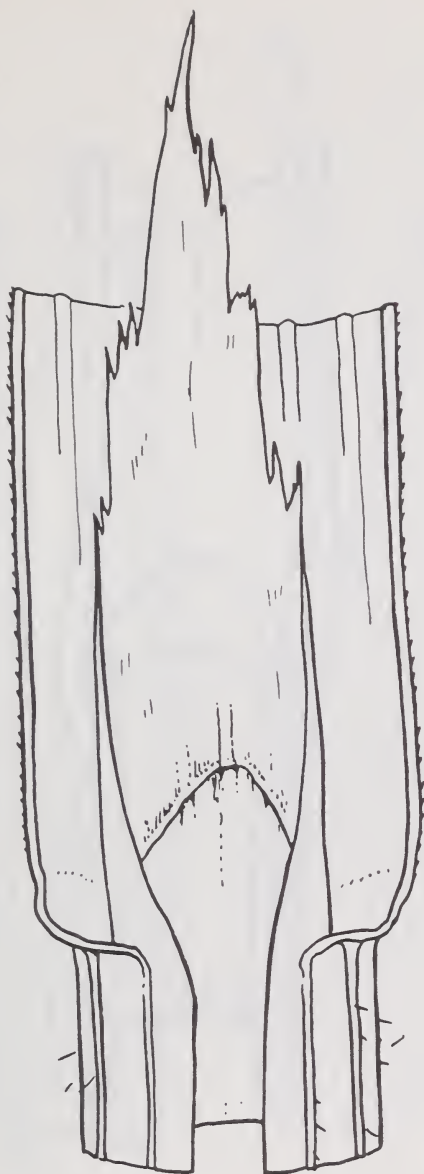
56. *Panicum obtusum* H.B.K. VINE-MESQUITE

Erect, almost a sod, strongly stoloniferous. Vernation — Curled. Blades — Flat, wide, long; glandular hairs ventrally; veins each side of midrib 4; ribs prominent; margin toothed; midrib prominent dorsally; width 4-6 mm, length 10-20 cm. Auricle — None. Ligule — Membranous, with occasional hairs 1-3 mm, obtuse-notched. Collar — Margin long-hairy. Sheath — Glandular hairs at base of plant. Node — Glabrous (Stolons hairy). Internode — Glabrous. Roots — Stoloniferous. Culm — Elliptical, not branched. Outstanding Characters — Blades flat, wide, long, stiff, narrow, pointed. Ligule membranous also long hairs 3-5 mm. Strongly stoloniferous with stolons up to 10 feet long. Sheath with glandular hairs at base of plant.



57. *Pappophorum mucronulatum* Nees. FEATHER PAPPUSGRASS

Erect, large bunchgrass. Vernation — Curled. Blades — Flat, drooping, narrow, pointed; rough ventrally, soft; veins each side of midrib 3-4; ribs prominent dorsally; margin toothed; midrib not prominent; width 3-4 mm, length 15-30 cm. Auricle — None. Ligule — Membranous, 2-4 mm, bearded, truncate-ciliate. Collar — Glabrous. Sheath — Glabrous, round, paper-like margin. Node — Glabrous. Internode — Glabrous. Roots — Fibrous. Culm — Round, branched at nodes. Outstanding Characters — Culms branch at nodes. Ligule membranous 2-4 mm, truncate-ciliate. Blades flat, drooping, narrow, pointed, 15-30 cm long.



58. *Poa bigelovii* Vasey & Scribn. BIGELOW BLUEGRASS

Erect, small annual bunchgrass. Vernation — Folded. Blades — Flat, wide, drooping, narrow, pointed, toothed; glabrous; veins each side of midrib 2; midrib not prominent; margin toothed; ribs not prominent; width 2-4 mm, length 4-12 cm, the tip boat-shaped. Auricle — None. Ligule — Membranous, hyaline 2-4 mm, acute-lacerate. Collar — Glabrous, divided. Sheath — Glabrous, margin hyaline. Node — Glabrous. Internode — Glabrous. Roots — Fibrous, annual. Culm — Elliptical, not branched. Outstanding Characters — Annual. Plant glabrous. Ligule hyaline 2-4 mm, acute-lacerate. Blade flat, wide, drooping, long, narrow, pointed.



59. *Poa fendleriana* (Steud.) Vasey. MUTTON BLUEGRASS

Erect, small bunchgrass. Vernation — Folded. Blades — Folded, erect, glabrous, stiff; ribs dorsal; margin glabrous; width $\frac{1}{2}$ -1 mm, length 10-20 cm, the tip boat-shaped. Auricle — None. Ligule — Membranous, small $\frac{1}{2}$ mm or less, obtuse-toothed. Collar — Glabrous. Sheath — Short canescent to glabrous, elliptical, the margin hyaline. Node — Glabrous. Internode — Glabrous. Roots — Fibrous. Culm — Elliptical. Outstanding Characters — Blade long, narrow and folded. Ligule small, obtuse-toothed.



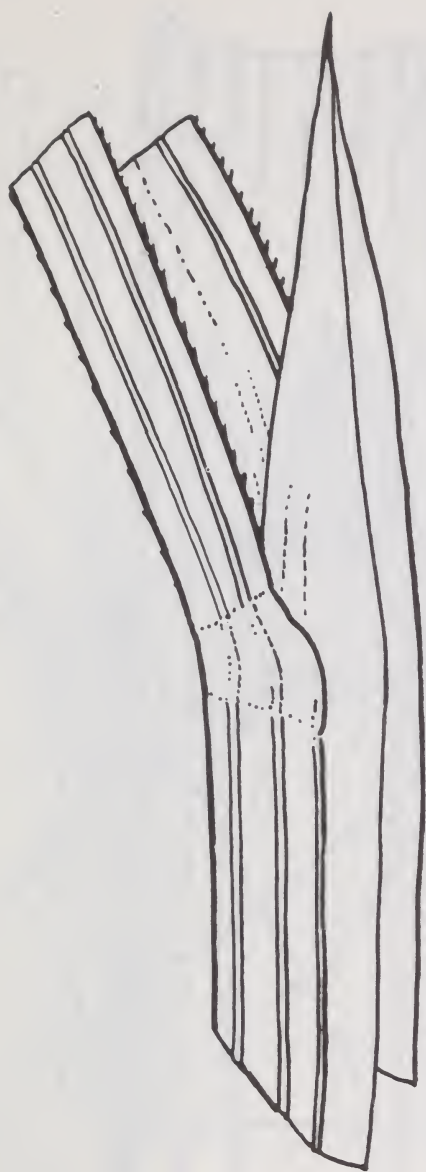
60. *Poa longiligula* Scribn. & Will
LONGTONGUE MUTTON BLUEGRASS

Erect, small bunchgrass. Vernation — Folded. Blades — Folded, erect, narrow, pointed; smooth; ribs prominent dorsally; veins indistinct; midrib prominent ventrally; width 1 mm, length 10-20 cm, the tip boat-shaped. Auricle — None. Ligule — Membranous, 2-7 mm, acute-lacerate. Collar — Glabrous. Sheath — Glabrous, elliptical. Node — Glabrous. Internode — Glabrous. Roots — Fibrous. Culm — Elliptical, not branched. Outstanding Characters — Blade long, narrow and folded. Ligule prominent, 2-4 mm, acute-lacerate. Blade ribs prominent dorsally.



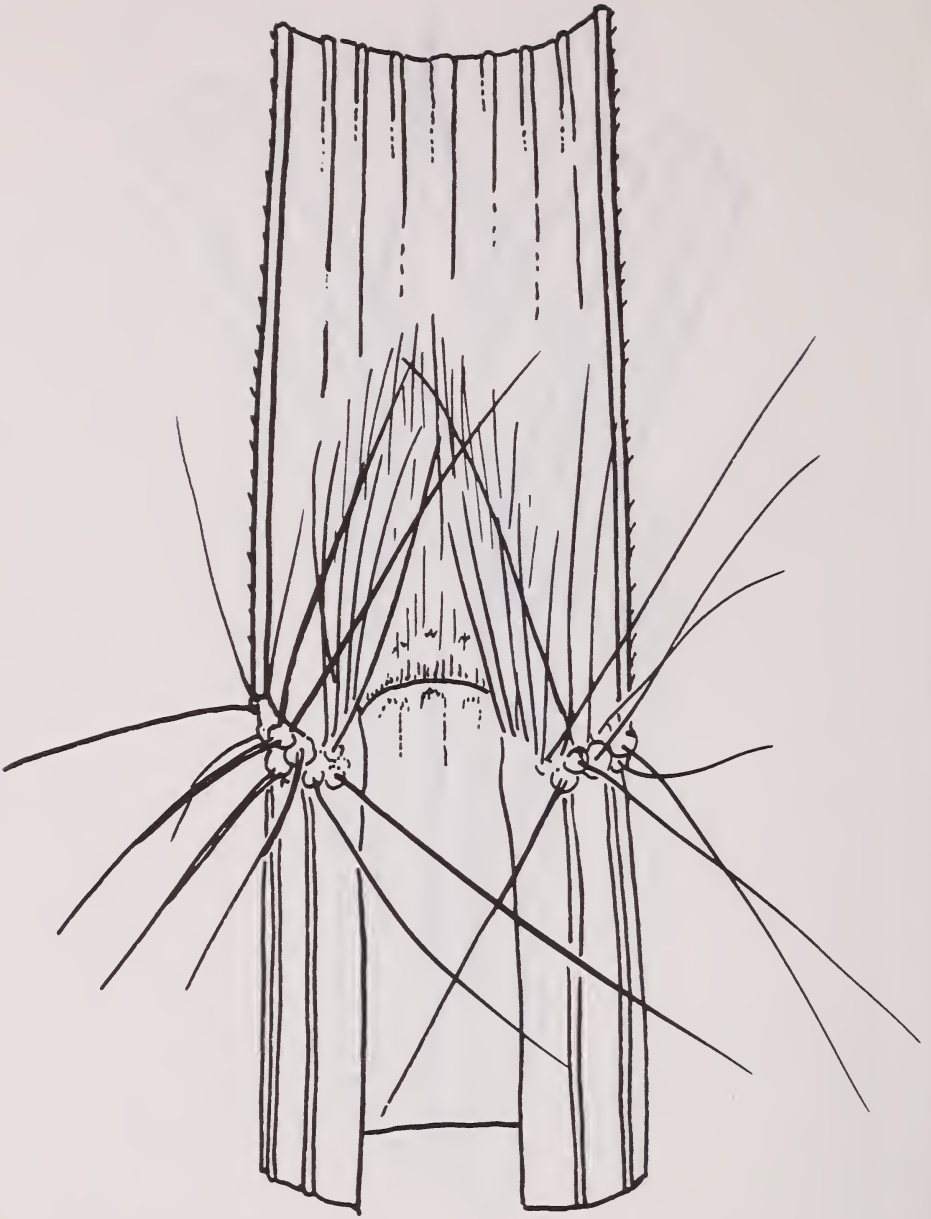
61. *Poa pratensis* L. KENTUCKY BLUEGRASS

Erect, sodgrass. Vernation — Folded. Blades — Folded, soft; ribs prominent ventrally; margin smooth; width 1 mm , length 10-20 cm , the tip boat-shaped. Auricle — None. Ligule — Membranous, collar-like, small $\frac{1}{4}$ - $\frac{1}{2}$ mm , truncate-entire. Collar — Glabrous, not prominent. Sheath — Glabrous, veined, elliptical, with membranous edges. Node — Glabrous. Internode — Glabrous. Roots — Short rhizomes. Culm — Flat, not branched. Outstanding Characters — Blades long, ribbed, folded. Ligule very small, truncate-entire. Short rhizomes.



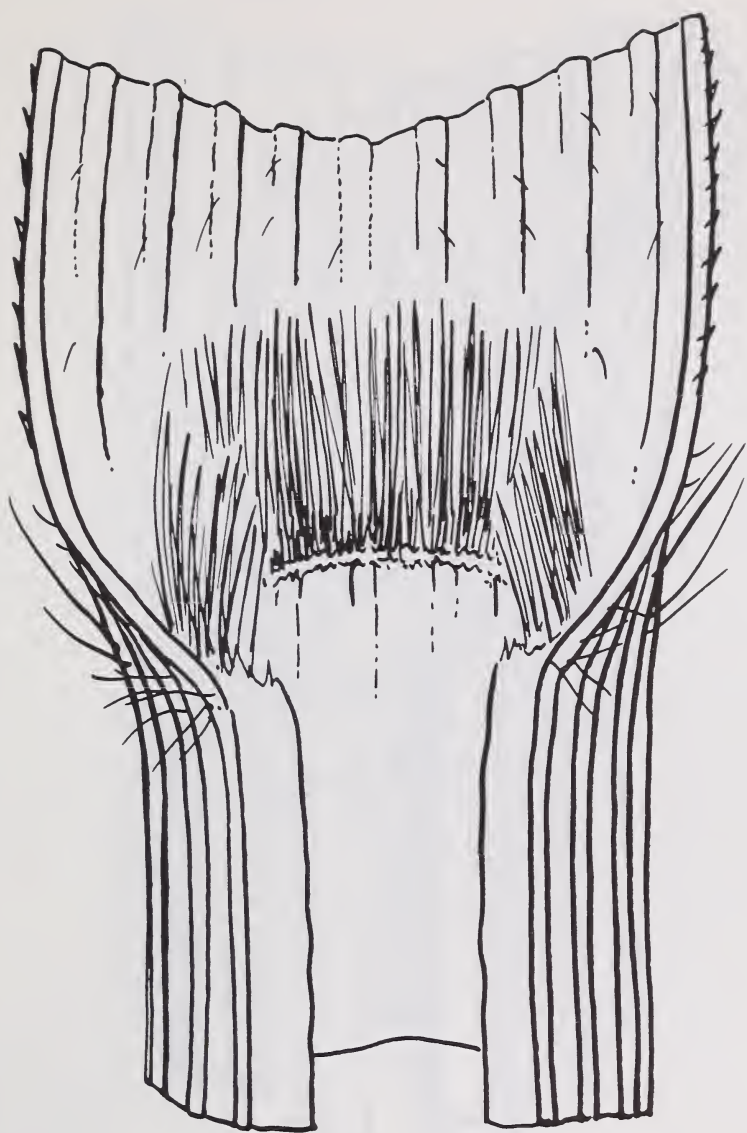
62. *Schedonnardus paniculatus* (Nutt.) Trel. TUMBLEGRASS

Erect, small bunchgrass. Vernation — Folded. Blades — Folded, twisted, erect, narrow, pointed; smooth, soft; veins each side of midvein 1-2; ribs indistinct; margin white, toothed; midrib prominent dorsally; width 1 mm, length 2-3 cm. Collar — Smooth. Auricle — None. Ligule — Membranous, 2-3 mm, acute-entire. Sheath — Flat, smooth, veined, paper-like white margined. Node — Glabrous. Internode — Glabrous. Roots — Fibrous. Culm — Flat, not branched. Outstanding Characters — Blade and sheath conspicuous white margin. Midrib prominent ventrally. Blade short, twisted. Ligule prominent extending down sheath margin.



63. *Schismus barbatus* (L.) Thell. MEDITERRANEANGRASS

Semidecumbent, small annual bunchgrass. Vernation — Curled. Blades — Rolled, narrow, short; hairy ventrally 3-8 mm ; too small to determine veins and ribs; width $\frac{1}{2}$ -1 mm , length 3-8 cm. Auricle — None. Ligule — Hairy, small 1-2 mm with scattered hairs 3-5 mm. Collar — Hairs 1-5 mm. Sheath — Glabrous, veined, hyaline margin. Node — Glabrous. Internode — Glabrous. Roots — Fibrous, annual. Culm — Round, not branched. Outstanding Characters — Annual semi-decumbent growth. Long hairs on ligule and collar. Blades rolled, very narrow and short. Roots annual.



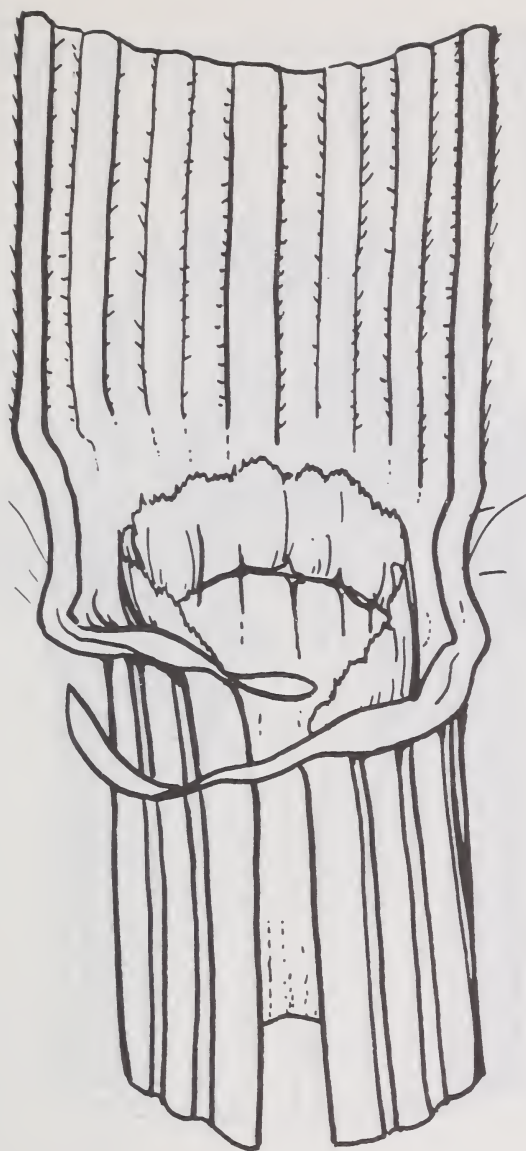
64. *Setaria geniculata* (Lam.) Beauv. KNOTROOT BRISTLEGRASS

Erect, large bunchgrass. Vernation — Curled. Blades — Folded, wide, long, drooping; hairy ventrally near ligule, these occasionally glandular; veins each side of midrib 4; ribs prominent; margin toothed; midrib not prominent; width 3-5 mm, length 10-20 cm. Auricle — None. Ligule — Hairy, 1-2 mm, bearded. Collar — Hairy. Sheath — Margin and lower nodes, culm hairy. Node — Hairy. Internode — Hairy. Roots — Fibrous. Culm — Elliptical, branched. Outstanding Characters — Ligule, node and lower internode hairy. Sheath margin hairy. Collar hairy. Blades folded.



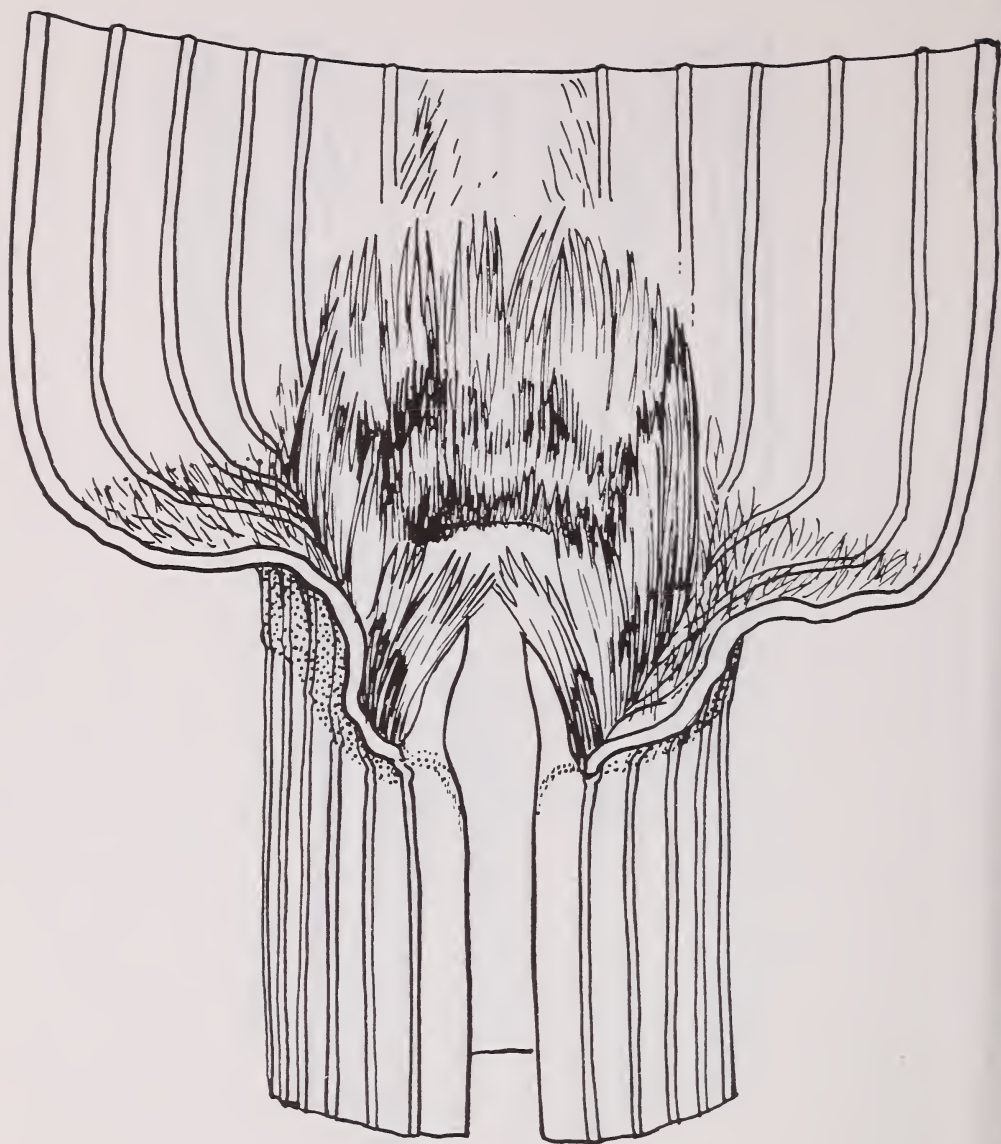
65. *Setaria macrostachya* H.B.K. PLAINS BRISTLEGRASS

Erect, lower semi-erect, small bunchgrass. Vernation — Curled. Blades — Flat, drooping, narrow, long; rough, soft, thin, veins each side of midrib 3-4; ribs prominent with lens; margin light color; midrib prominent ventrally; width 2-3 mm, length 5-20 cm. Auricle — None. Ligule — hairy, small $\frac{1}{2}$ -1 mm. Collar — Hairy margin, divided. Sheath — Occasionally hairy margin. Node — Glabrous to hairy. Internode — Glabrous to hairy near nodes. Roots — Fibrous. Culm — Flat, not branched. Outstanding Characters — Culms flat. Blade in bud curled. Blade flat, long drooping. Ligule hairy, medium 1-2 mm. Sheath occasional marginal hairs.



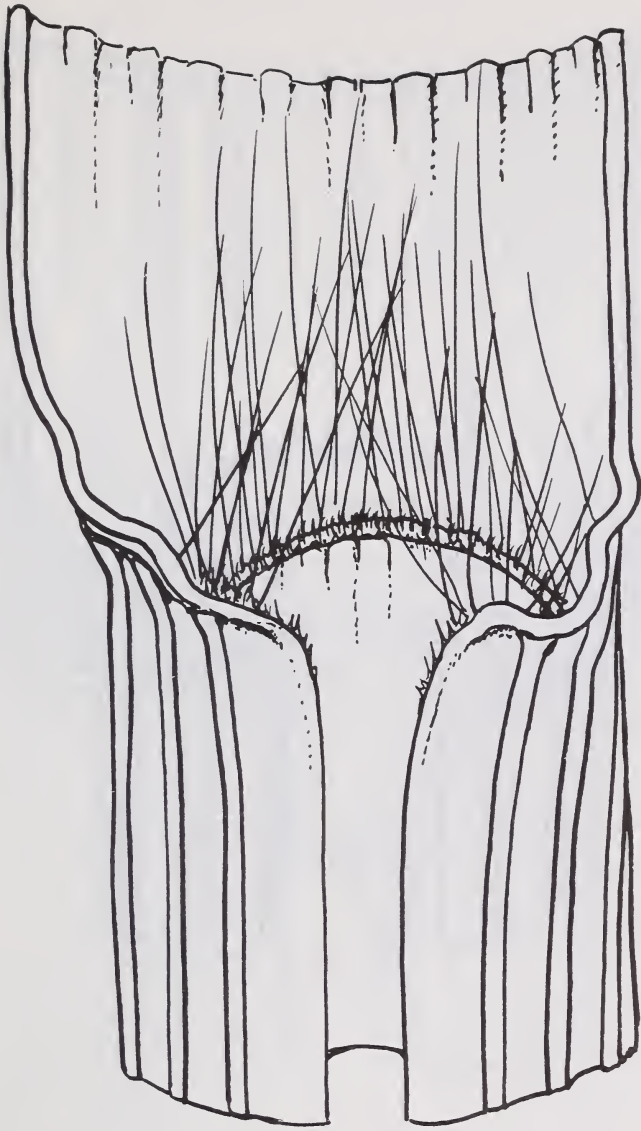
66. *Sitanion hystrix* (Nutt.) J. G. Smith.
BOTTLEBRUSH SQUIRRELTAIL

Semi-erect, small bunchgrass. Vernation — Curled. Blades — Usually flat, twisted, drooping, narrow, pointed; rough, pubescent to glabrous; veins each side of midrib, 2-4; ribs prominent dorsally; 2-3 mm wide, 5-20 cm. long. Auricle — Small 1 mm. Ligule — Membranous, small $\frac{1}{4}$ mm, truncate-entire. Collar — Glabrous, divided. Sheath — Pubescent or glabrous, ribbed, round frequently pinkish. Nodes — Glabrous. Internodes — Glabrous. Roots — Fibrous. Culm — Round, not branched. Outstanding Characters — Auricle. Semi-decumbent. Ribs prominent dorsally.



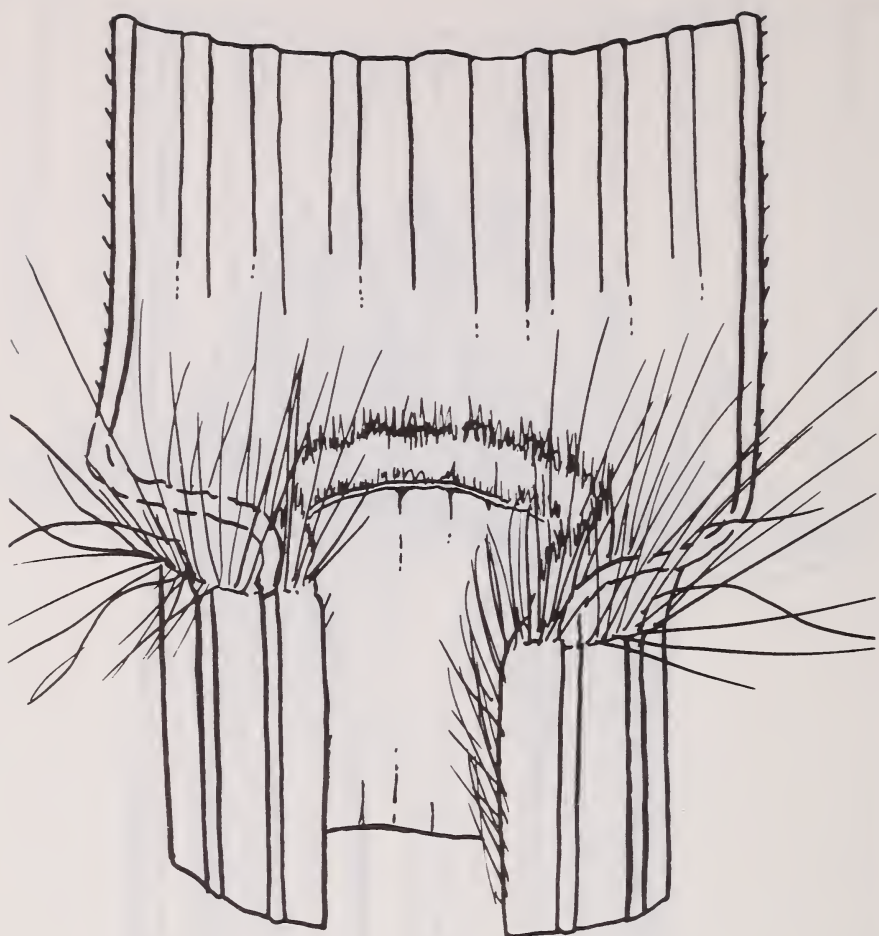
67. *Sorghum halepense* (L.) Pers. JOHNSONGRASS

Erect, sod-like. Vernation — Curled. Blades — Flat, wide, drooping, narrow, pointed; veins each side of midrib 5-7 ribs indistinct; margin toothed, white; midrib prominent dorsally; width 10-15 mm, length 20-40 cm. Auricle — None. Ligule — Hairy, obtuse, 1-2 mm. Collar — Pubescent to glabrous. Sheath — Elliptical, veined. Node — Glabrous to very short canescent. Internode — Glabrous. Roots — Rootstalk rhizomatous. Culm — Elliptical, occasionally branched. Outstanding Characters — Massive rootstalks rhizomes. Blade margin white. Blades large, flat. Prefers wet areas, roadside, irrigation ditches.



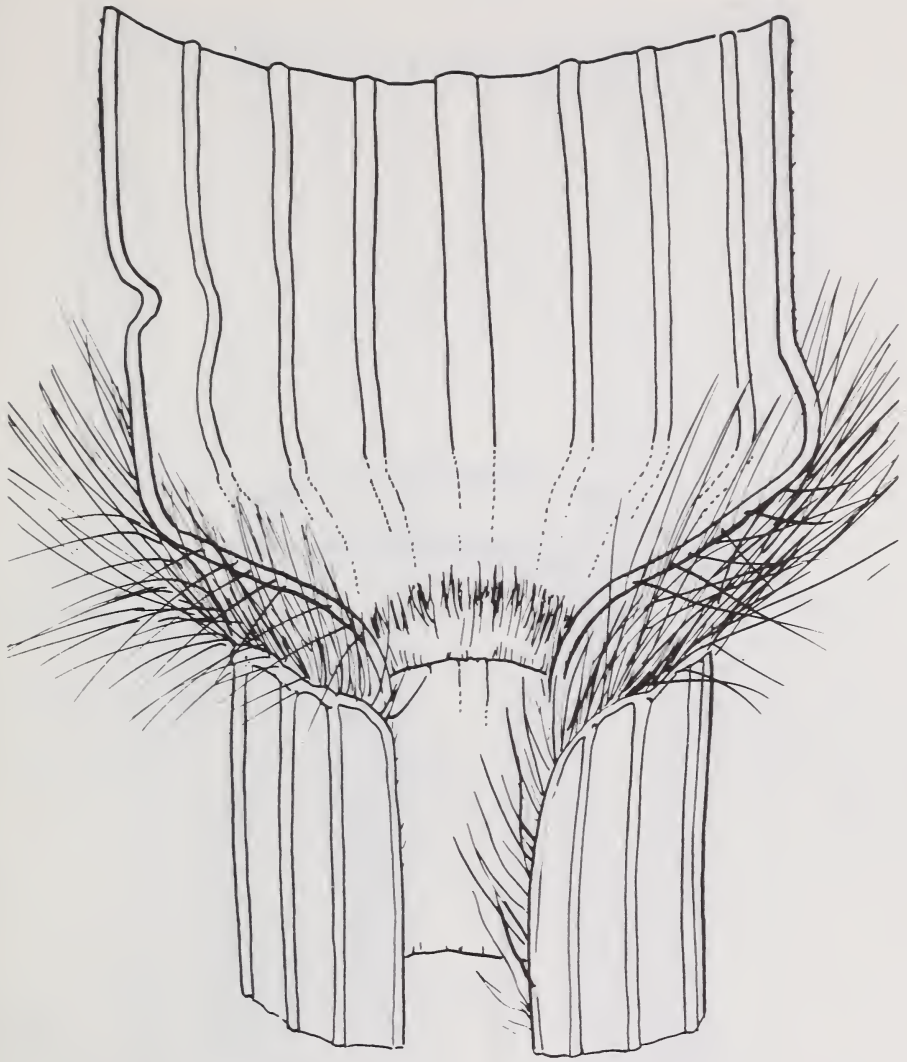
68. *Sporobolus airoides* Torr. ALKALI SACATON

Erect, large bunchgrass. Vernation — Curled. Blades — Rolled, drooping, narrow, pointed; glabrous, veins each side of midrib 3-4; ribs indistinct; margin glabrous; midrib not prominent; width 1 mm , length 10-25 cm. Auricle — None. Ligule — Hairy, $\frac{1}{2}$ - $\frac{1}{4}$ mm , hairs on back of ligule 1-3 mm. Collar — Pubescent margin, divided. Sheath — Round, glabrous, papery margin. Node — Glabrous. Internode — Glabrous. Roots — Short rhizomes. Culm — Round, not branched. Outstanding Characters — Blade narrow, long, rolled. Ligule hairy, small $\frac{1}{4}$ - $\frac{1}{2}$ mm , long hairs at back 1-3 mm. Large bunches 1-2 feet when mature.



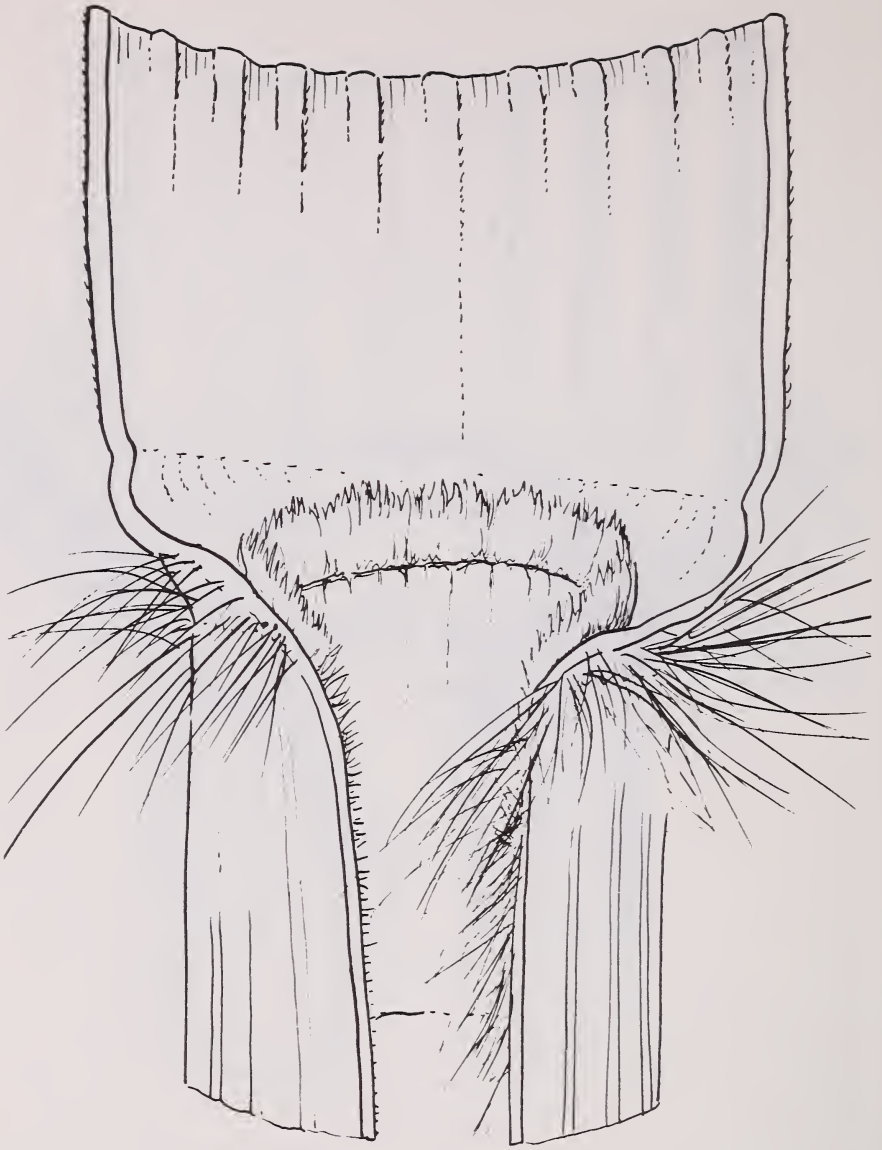
69. *Sporobolus asper* (Michx.) Kunth. TALL DROPSEED

Erect, medium bunchgrass. Vernation — Curled (sometimes reported as clasping). Blades — Usually flat, narrow, pointed; glabrous, rough ventrally, soft; veins each side of midrib 2-3; margin toothed; ribs prominent ventrally and dorsally; width 2-3 mm, length 5-20 cm. Auricle — None. Ligule — Hairy, short. Collar — Tufted. Sheath — Hairy margin 2-3 mm, usually pinkish at base. Node — Glabrous. Internode — Glabrous. Roots — Fibrous. Culm — Round, frequently branched at node. Outstanding Characters — Blade flat, glabrous. Collar tufted. Sheath occasionally with marginal hairs. Panicles included well in sheath. Culm usually branched. In Arizona known only from Apache County.



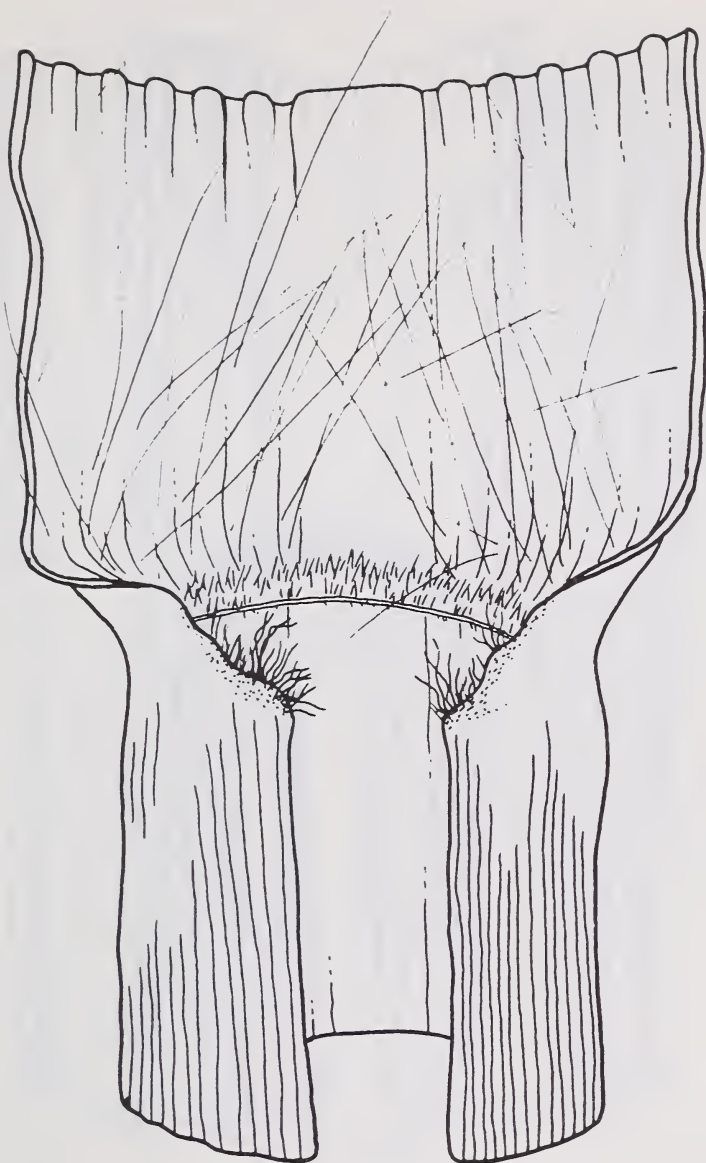
70. *Sporobolus cryptandrus* (Torr.) A. Gray. SAND DROPSEED

Erect, medium bunchgrass. Vernation — Curled. Blades — Flat, wide, long; glabrous; veins each side of midrib 3-4; ribs prominent; margin toothed; midrib not prominent; width 3-8 mm, length 15-20 cm. Auricle — None. Ligule — Hairy, hairs 2-3 mm on margin. Collar — Conspicuous tufts of hair on margin, 2-3 mm. Sheath — Hairy often on one margin, the panicle more or less covered by the sheath. Node — Glabrous. Internode — Glabrous. Roots — Fibrous. Culm — Round, not branched. Outstanding Characters — Blades flat, long. Panicle included in sheath. Ligule and collar bearded. Culms not branched. Almost throughout the state, 150-7,000 feet elevation.



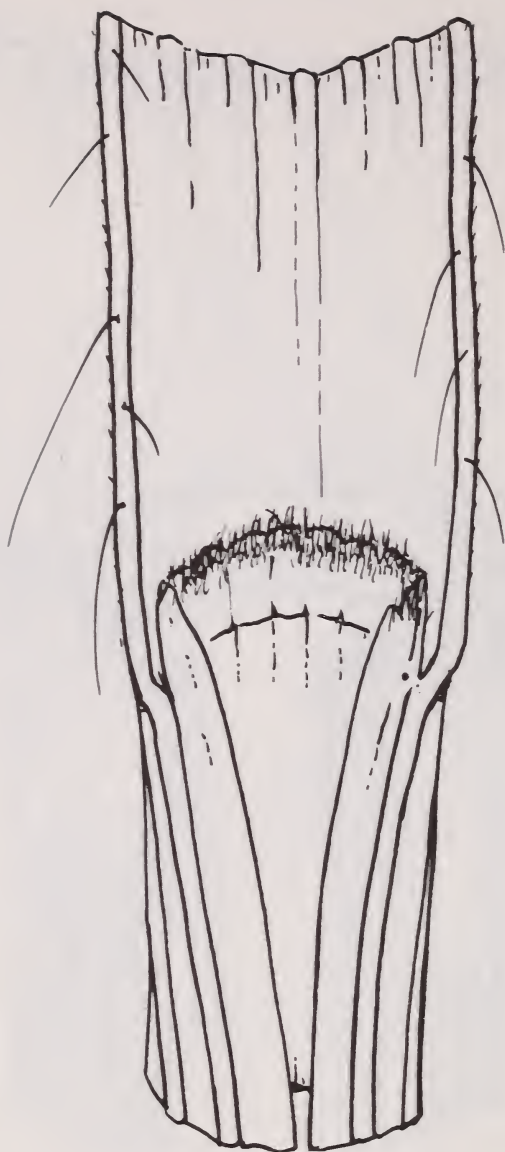
71. *Sporobolus giganteus* Nash. GIANT DROPSEED

Erect, large bunchgrass. Vernation — Curled. Blades — Flat to rolled, erect; rough ventrally, stiff; veins each side of midrib 3-4; ribs prominent dorsally; margin toothed; midrib not prominent; width 2-8 mm , length 15-35 cm. Auricle — None. Ligule — Hairy, short, $\frac{1}{2}$ mm. Collar — Glabrous, margins tufted, distinct. Sheath — Round, one margin usually hairy, veined. None — Glabrous. Internode — Glabrous. Roots — Fibrous. Culm — Round, not branched. Outstanding Characters — Ligule large, hyaline, 6-12 mm , acute. Blade long, usually rolled. Large bunchgrass.



72. *Sporobolus wrightii* Munro. SACATON

Erect, large bunchgrass. Vernation — Curled. Blades — Flat, drooping, long, narrow, pointed; glabrous; veins each side of midrib 3; ribs prominent ventrally; margin toothed; midrib prominent ventrally; width 3-6 mm, length 45-60 cm. Auricle — None. Ligule — Hairy small, $\frac{1}{2}$ mm, obtuse-lacerate. Collar — Glabrous. Sheath — Glabrous, veined, round. Node — Glabrous. Internode — Glabrous. Roots — Fibrous. Culm — Round. Outstanding Characters — Blades flat, long, wide. Ligule short, hairy. Large coarse bunchgrass.



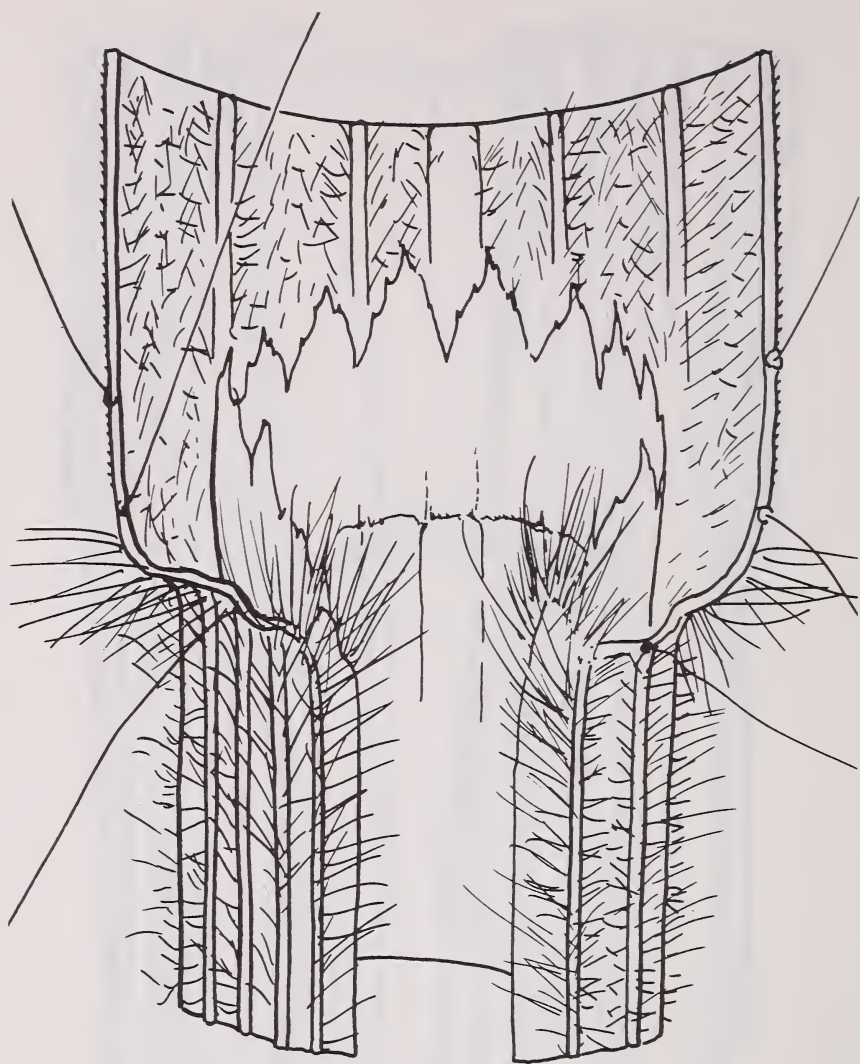
73. *Stipa neomexicana* (Thurb.) Scribn.
NEW MEXICAN FEATHERGRASS

Erect, medium bunchgrass. Vernation — Folded (reported as curled in Colorado). Blades — Rolled, drooping, narrow, pointed; glabrous; veins indistinct; midrib not prominent; width $\frac{1}{2}$ -1 mm, length 25-35 cm. Auricle — None. Ligule — Membranous, very small $\frac{1}{4}$ mm, truncate-ciliate. Collar — Glabrous, margin appearing hairy, divided, indistinct. Sheath — Elliptical, veined. Node — Glabrous. Internode — Glabrous. Roots — Fibrous. Culm — Elliptical, not branched. Outstanding Characters — Blades long, needle-like. Ligule very small, $\frac{1}{4}$ mm, truncate-ciliate. Awns long, twisted with long hairs toward tip.



74. *Stipa pringlei* Scribn. PRINGLE NEEDLEGRASS

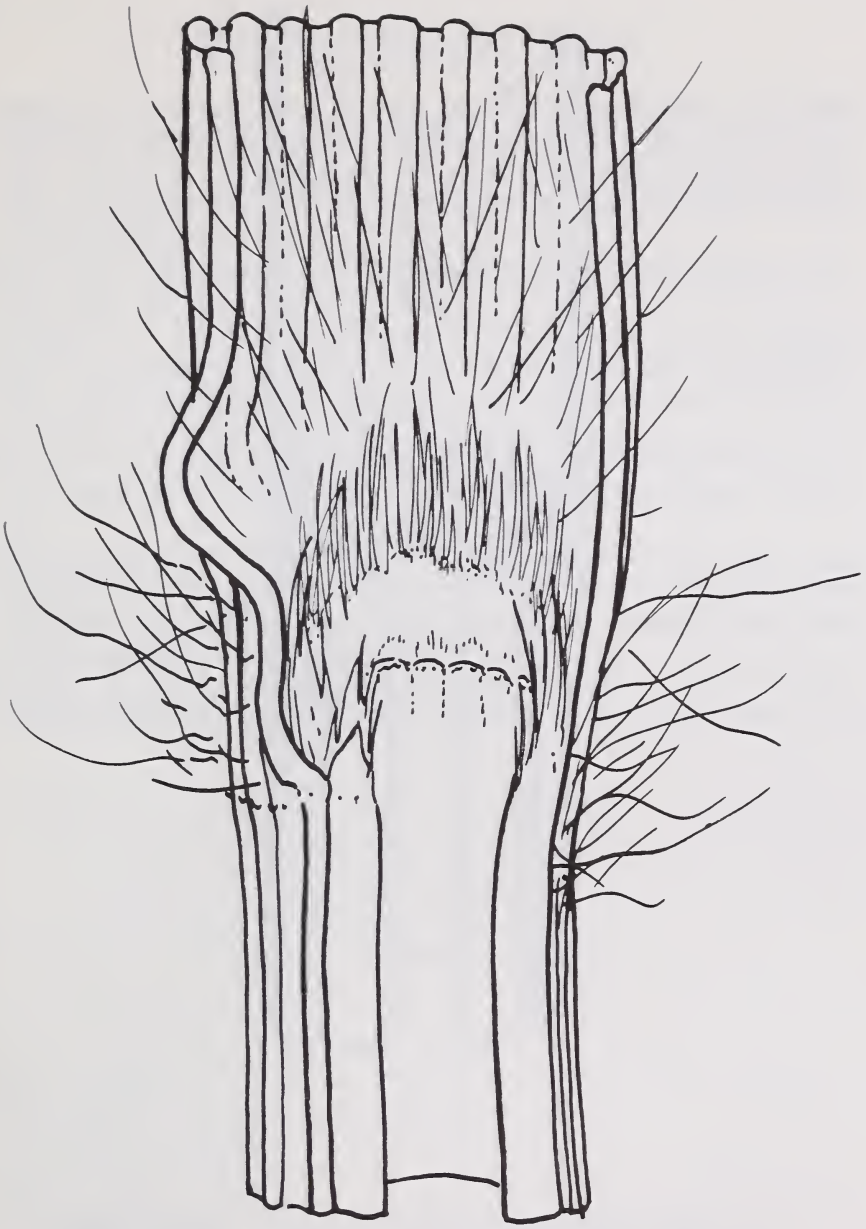
Erect, small bunchgrass. Vernation — Curled. Blades — Flat, drooping, narrow, pointed; rough ventrally; veins each side of midrib 2; ribs prominent ventrally and dorsally; margin toothed; midrib prominent ventrally; width 2 mm, length 20-30 cm. Auricle — None. Ligule — Membranous, small 1-2 mm, obtuse-lacerate. Collar — Glabrous. Sheath — Elliptical, veined, margin hyaline. Node — Usually pubescent. Internode — Glabrous to short canescent near nodes. Roots — Fibrous. Culm — Elliptical, not branched. Outstanding Characters — Blades flat, narrow, long. Ligule membranous, small 1-2 mm, obtuse-lacerate. Awns twisted 1-3 cm.



75. *Trichachne californica* (Benth.) Chase.

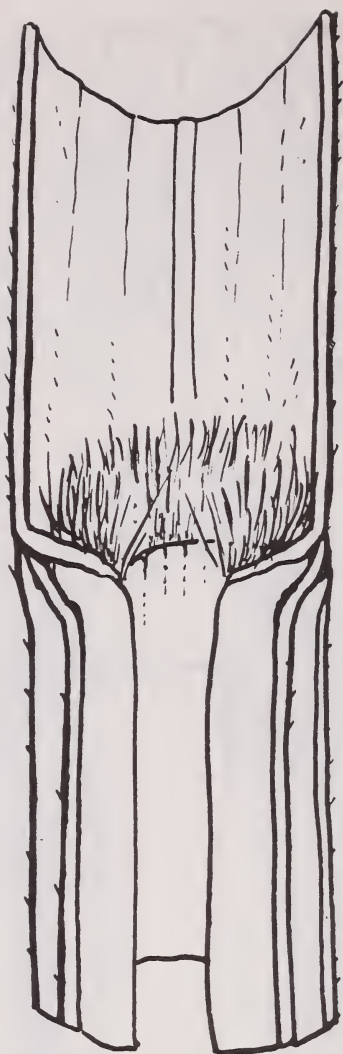
ARIZONA COTTONTOP

Erect, large bunchgrass. Vernation — Curled. Blades — Flat, drooping, narrow, pointed; glabrous or pubescent ventrally and dorsally, occasional glandular hairs dorsally; veins each side of midrib 3; ribs prominent ventrally; margin toothed, white; midrib prominent; width 3-4 mm, length 8-12 cm. Auricle — None. Ligule — Membranous, 2-3 mm, obtuse-lacerate. Collar — Hairy ventrally, entire. Sheath — Glabrous or pubescent, elliptical, margin hairy. Node — Pubescent, occasionally glabrate. Internode — Glabrous. Roots — Fibrous. Culm — Elliptical, branched. Outstanding Characters — Blade margin white. Blades flat, long. Culms branched. Ligule 2-3 mm, obtuse-lacerate.



76. *Tridens muticus* (Torr.) Nash. SLIM TRIDENS

Erect, small bunchgrass. Vernation — Curled. Blades — Rolled, erect, narrow, pointed; with occasional glandular hairs dorsally; scabrous; midrib prominent dorsally; veins each side midvein 4-5; width 2-4 mm, length 8-20 cm. Auricle — None. Ligule — Hairy, small $\frac{1}{2}$ -1 mm. Collar — Hairy. Sheath — Open, hairy on margin, round. Node — Pubescent. Internode — Glabrous. Roots — Fibrous. Culm — Round. Outstanding Characters — Blade usually rolled. Ligule hairy and small. Node pubescent.



77. *Tridens pulchellus* (H.B.K.) Hitchc. FLUFFGRASS

Erect, small bunchgrass. Vernation — Folded. Blades — Rolled, erect, very small, narrow, pointed; rough ventrally; ribs distinct, veins indistinct; margin toothed; width $\frac{1}{4}$ mm, length 2-5 cm. Auricle — None. Ligule — Hairy, small $\frac{1}{2}$ mm. Collar — Smooth, small, entire. Sheath — Margin paper-like, the lower long ciliate. Node — Glabrous, roots at nodes. Internode — Glabrous to pubescent. Roots — Fibrous. Culm — Elliptical, terminal node branched with cluster of flowers often cobwebby. Outstanding Characters — Blades ribbed, rolled, small and short. Sheath margin conspicuously paper-like, long ciliate. Flowers clustered, somewhat exceeded by the leaves, cobwebby. Roots at nodes.

REFERENCE PUBLICATIONS

- Copple, R. F., and Aldous, A. E. 1932. The identification of certain native and naturalized grasses by their vegetative characters. Kans. Agric. Exp. Stn. Tech. Bull. 32, 73 p., illus. Contains keys, descriptions, and drawings of 26 species of Kansas grasses, many of which occur in Arizona.
- Gould, F. W. 1951. Grasses of the southwestern United States, Univ. Ariz. Biol. Sci. Bull. 7, 352 p., illus.
- Harrington, H. D., and Durrell, L. W. 1944. Key to some Colorado grasses in vegetative condition. Colo. Agric. Exp. Stn. Tech. Bull. 33, 86 p., illus. Contains keys, descriptions, and drawings of 119 species of grasses, many of which occur in Arizona.
- Hitchcock, A. S. 1950. Manual of the grasses of the United States. U. S. Dep. Agric. Misc. Publ. 200, Ed. 2, revised by Agnes Chase. 1,050 p., illus.
- Humphrey, Robert R. 1958. Arizona range grasses. Ariz. Agric. Exp. Stn. Bull. 298, 104 p., illus. Contains drawings and descriptions, with information on distribution, forage value, and management of the grasses included in the present publication.
- Kearney, T. H., and Peebles, Robert H. 1951. Arizona flora. 1,032 p., illus. Berkeley and Los Angeles: Univ. Calif. Press.

GLOSSARY

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|----------------|---|
| ACUTE: | Terminating sharply in an angle of less than 90 degrees. |
| AURICLE: | Small, membranous, claw-like extension of the collar of some grasses. |
| AWN: | A needle-like extension of the grass floret, as in <i>Stipa</i> (needlegrass) or <i>Aristida</i> (three-awn). |
| CANESCENT: | Grayish or whitish due to dense, fine hairs. |
| CILIATE: | Fringed with hairs on the edge. |
| COLLAR: | The region on the outer side of the grass leaf at the junction of the sheath and blade. |
| CORM: | A swollen or enlarged, rounded, solid, fleshy, mostly subterranean, stem base. Like a bulb in shape and appearance, except that it is solid instead of being composed of fleshy scales. |
| CULM: | The jointed stalk or stem of grasses, usually hollow except at the nodes, and mostly herbaceous. |
| DECUMBENT: | Reclining on the ground but with the end ascending, bending horizontally at the base. Said of stems. Decumbent conveys the idea of weakness. |
| DIVIDED: | Refers to the shape of the collar on the back of the sheath. |
| DORSAL: | Refers to the top of the blade, opposite to ventral. |
| ELLIPTICAL: | The cross section of the stem partially flattened. |
| ENTIRE: | With an even margin, without teeth or lobes. |
| FIBROUS: | Refers to a mass of thread-like roots. |
| FLORET: | A unit of the spikelet of a grass inflorescence, consisting usually of lemma, palea, stamens, and pistil. |
| GENICULATE: | Knee-like; bent like a knee; said of stems and awns of needlegrass (<i>Stipa</i>). |
| GLABRATE: | Becoming glabrous or nearly so in age. |
| GLABROUS: | Devoid of hairs or pubescence; smooth in the sense of absence of all hairiness. |
| GLANDULAR: | Pertaining to or possessing glands at the base of hairs. |
| GLOSSY: | Smooth, shining. |
| HIRSUTE: | Hairy with rather coarse, stiffish, straight, beard-like hairs. |
| HISPID: | Bristly; beset with stiff, rough, bristle-like hairs. |
| HYALINE: | Thin and translucent. |
| INFLORESCENCE: | The flowering portion of a grass plant, consisting of spikelets and florets. |
| INTERNODE: | The portions of a stem between the nodes, or joints. |
| INVOLUTE: | Inrolled; i.e. with both edges rolled in toward the middle (blade) each edge presenting a spiral appearance in cross-section. |
| LACERATE: | Deeply and irregularly cut along the edges. |

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| LANCEOLATE: | Lance-shaped; several times longer than broad, and tapering from the relatively narrow base to apex. |
| LIGULE: | The projecting, usually tongue-like, membranous end of the lining of the leaf sheath, seen at the base of the leaf, between it and the stalk, and a very characteristic feature of the grass family. The ligule is quite often an important means of distinguishing grasses; sometimes it is reduced to a mere fringe of hairs or to a hardened ring. |
| MAT: | Growing thickly, or closely interwoven. |
| MIDRIB: | The central or main rib common in blades of grasses. |
| NODE: | A joint or knot. Said especially of stems, whose nodes or joints are enlarged, often dark colored, and are the points whence leaves and additional flowers often spring. |
| NOTCHED: | An edge with teeth or lobes. |
| OBTUSE: | Blunt or rounded at the tip; not sharply pointed. |
| PANICLE: | An open inflorescence in which the lower branches are typically longer and blossom earlier than the upper branches. |
| PERENNIAL: | Lasting for three or more years; said especially of herbaceous plants that are neither annual nor biennial. |
| PILOSE: | Hairy with soft, slender hairs. |
| PLUMED: | Feather-like, having fine hairs on either side as the awn of certain <i>Stipa</i> species. |
| PUBESCENT: | Clothed with soft hairs or down. |
| PUNGENT: | Sharply and rigidly pointed. |
| RACEME: | A simple, elongated, indeterminate flower cluster. |
| RACHIS: | The axis of a spike, raceme, or branch of a panicle; the organ that supports the florets. |
| RETROSE: | Directed back or downward, as hairs on the sheath of certain grasses. |
| RHIZOME: | An underground stem; recognized by the regular nodes and internodes; e.g. <i>Sorghum halepense</i> . |
| RIB: | The primary veins of a blade. |
| RUDIMENTARY: | Reduced. |
| RUNNER: | A long, slender form of creeping branch, prostrate on the ground. Each runner, after having grown to its full length, strikes root from the tip (it sometimes roots at the joints also, in which case it may merge into a stolon), fixing the tip to the ground, then forms a bud at that point, which later develops into a tuft of leaves and so gives rise to a new plant. |
| SCABROUS: | Rough or harsh to the touch. |
| SCALLOPED: | Margin of a blade that buckles, resulting in waves. |

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| SHEATH: | In grasses, the lower part of the leaf which envelops the stem or culm. |
| SHREDDED: | Deeply and irregularly cut along the edges. |
| SOD: | A group of plants growing densely together forming a solid mat, as buffalograss or Kentucky bluegrass grown for lawns. |
| SOLID: | Applied to the culm, which is solid in a few grasses and all sedges and rushes. |
| SPIKELET: | In grasses, the name applied to the cluster of one or more florets. |
| STOLON: | A trailing or reclining branch, above ground, which takes root where it touches the soil, there sending up new shoots which later become separate plants. |
| TOOTHED: | An edge with regular notches. |
| TRUNCATE: | Squared at the tip; terminating abruptly as if cut off crosswise. |
| VEIN: | One of the fibrovascular bundles forming part of the framework (skeleton) of a leaf; more or less parallel veinations (as in a grass blade). |
| VENTRAL: | Refers to the inner surface of the blade, facing the culm as the leaf is held erect. |
| VILLOUS: | Densely hairy with long, soft hairs. |
| WOOLLY: | Covered with long, matted hairs. |

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Seventy-seven common Arizona range grasses are included in this vegetative key. A shortcut key also assists in rapid identification. In a separate section, grasses are grouped according to major vegetative characters. A sketch of the ligule and collar area of each species provides an easy means of comparison with certain key characters. A detailed description of the vegetative characters of each species provides a final check on identification.

Keywords: Vegetative key, Arizona grasses.

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